IRON & COAL

THE IRON AND COAL TRADES' REVIEW

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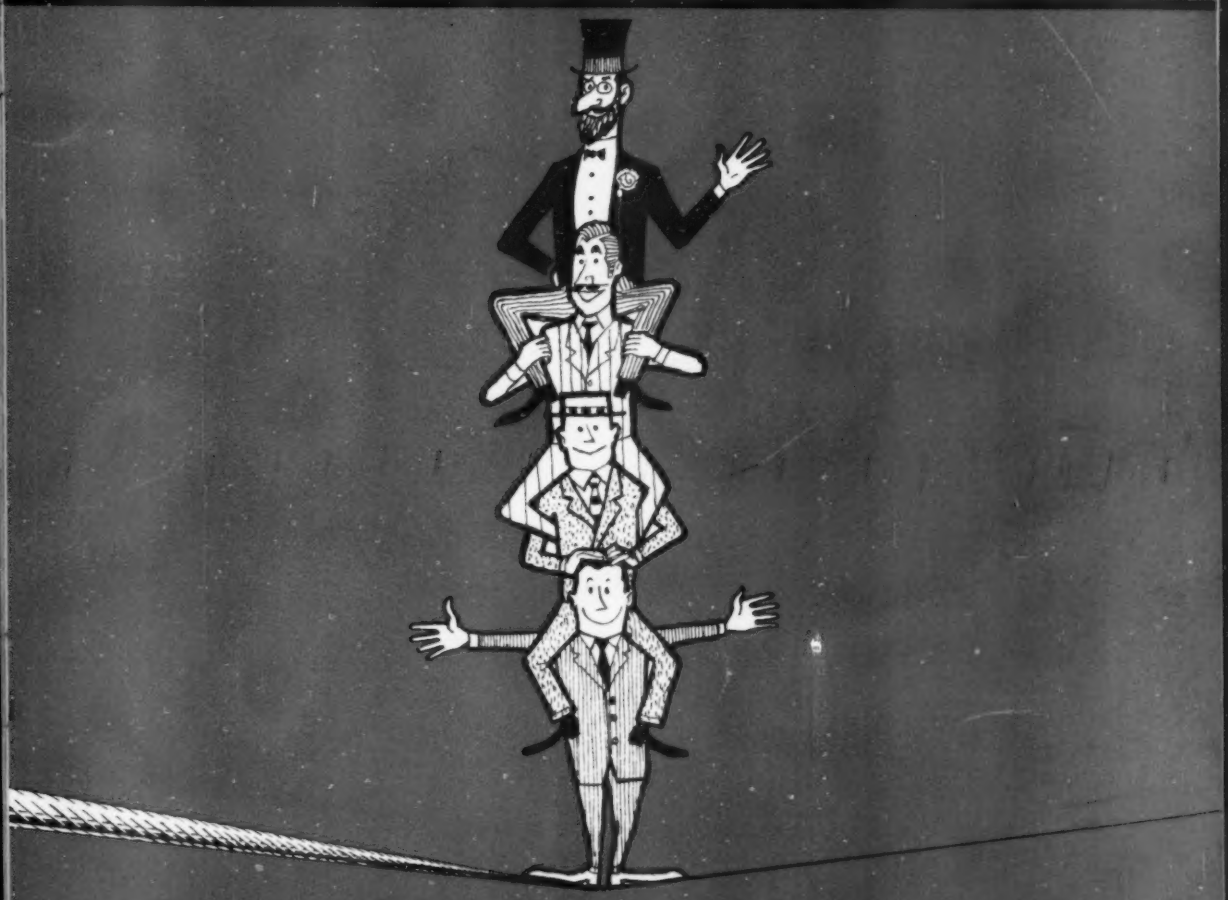

Glover wire ropes bear the weight of 120 years' experience

DEPENDABILITY, STRENGTH and EXPERIENCE are built into every one of the many types of Glover Wire Rope. Glovers produce a rope for every requirement but specialise in Steel Wire Ropes for Aerial Ropeways, Cableways, Chair Lifts, Conveyors, Drag Scrapers, etc.

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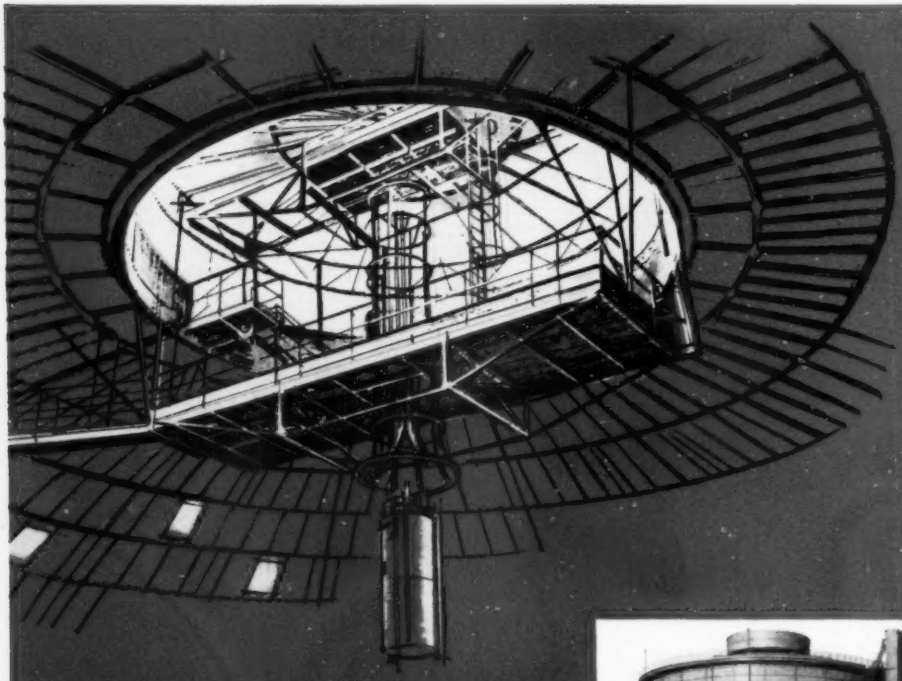
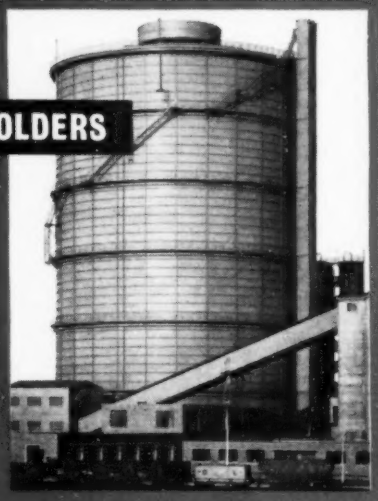


ABP-KLONNE TYPE DRY GASHOLDERS



RECENT CONTRACTS

Town	Capacity (cu. ft.)	Gas Stored
Bilston	1 million	Blast furnace
Middlesbrough	3 million	Coke oven
Middlesbrough	5 million	Blast furnace
Motherwell	1 million	Coke oven
Motherwell	5 million	Blast furnace
Middlesbrough	3 million	Blast furnace
West Hartlepool	3 million	Blast furnace
Dagenham	5 million	Coke oven
Dagenham	5 million	Coke oven
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Corby	2 million	Coke oven
Newport	5 million	Blast furnace
Newport	2 million	Coke oven
Scunthorpe	3 million	Blast furnace

For further information write for brochure.

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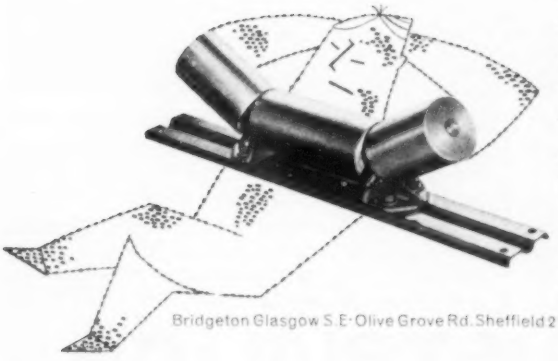
IDLERS THAT DO THE DIRTY WORK



All M & C idlers are perpetually sealed against grit, dirt, dust and water. They keep conveyor belts carrying the dirtiest loads running smoothly year after year.
Many M & C idlers are still in use with the original bearings after over 25 years of service. The almost frictionless sealing helps these idlers still to spin at a touch. If you want idlers for heavy dirty work or powdery spill-free loads, you'll find just the ones for the job at M & C.

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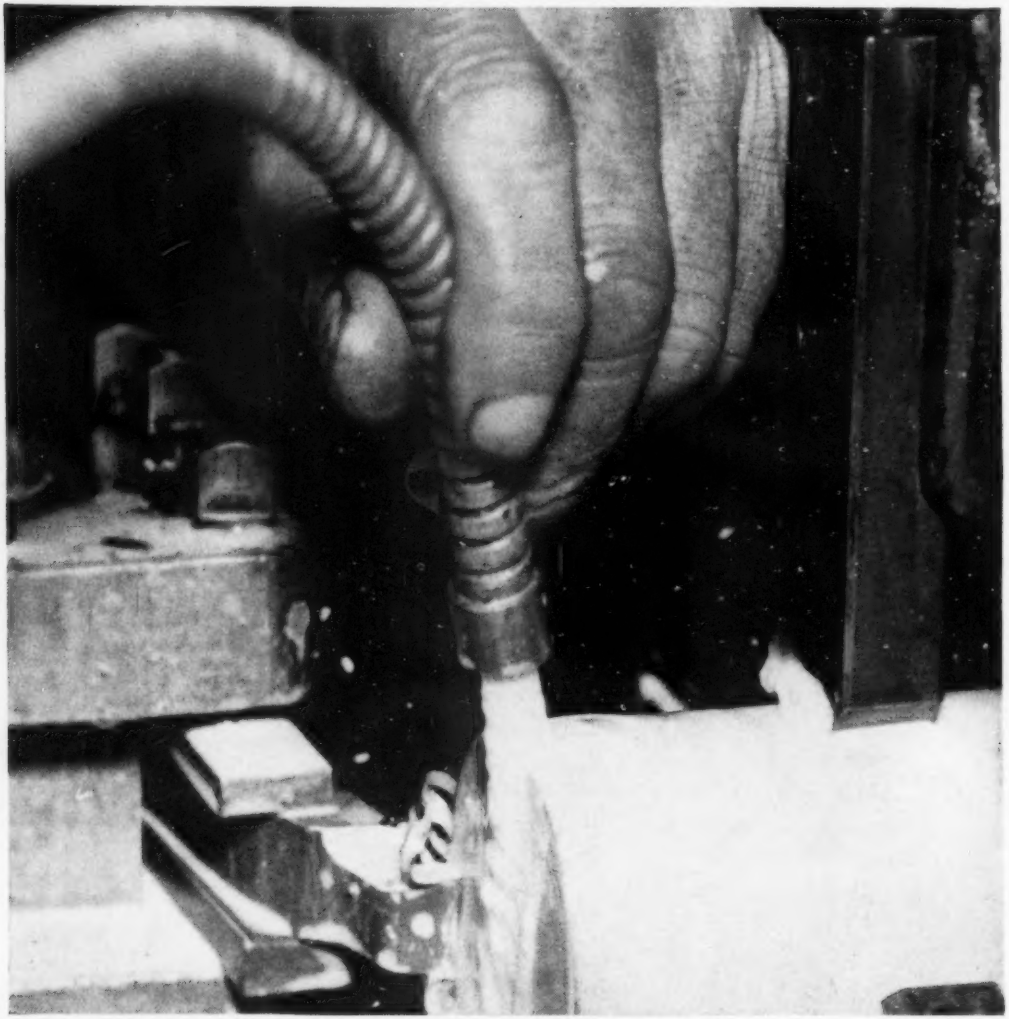
1

Shell achievement

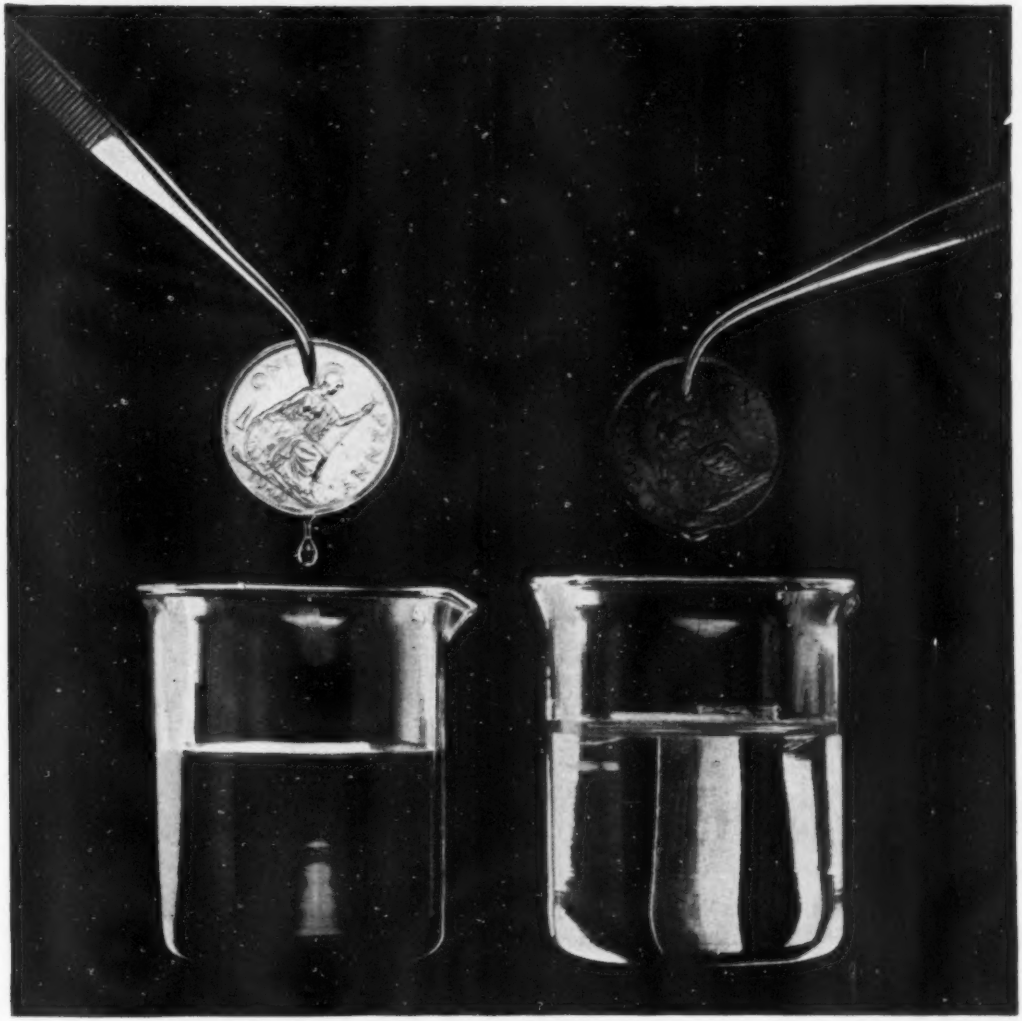


One of Shell's recent achievements in Industrial Lubrication has been to reduce the risk of skin trouble for machine operators. Until the new Shell Dromus range, most modern soluble cutting oils contained phenolic compounds, which can cause skin irritation. They were used as coupling agents between the actual oil and the emulsifier. On high-speed machines, especially, the water evaporates and the emulsion concentrates. And that's when the trouble can start. Shell scientists found a better coupling agent, and made it work. And now, at no extra cost, management can reduce working risks for their staff. *Write for the book, 'Selecting Your Cutting Oils', to Shell-Mex House, London.*

SHELL

SHELL INDUSTRIAL OILS

Shell demonstration



Two clean, bright pennies are placed in beakers of oil, of equal performance level, one Shell Garia Oil 21, the other a conventional cutting oil containing sulphurised additives. After three hours at room temperature one penny is still bright and stain-free, the other heavily stained with black copper sulphide. The bright penny is from the beaker containing Shell Garia Oil 21, the blackened one from that containing the conventional oil. While these were just pennies they could have been bronze bushes in your machine tools—stained in less than half a shift. Sulphur is essential in heavy-duty cutting oils. Special additives in Shell Cutting Oils protect your machine tools and yet allow the sulphur to do its job.

Write for the book "Selecting Your Cutting Oils" to Lubricants Department, Shell-Mex House, London, W.C.2.

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A HYDRAULIC RAM built to give reliable service under the worst pit conditions. Material and design specifications of the highest standard.
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Designed to meet the most arduous operating conditions, this Silvertown PREMIUM belting of Cotton/Nylon/PVC construction has now been granted Full Approval No. 159 by the National Coal Board.

This Silvertown belting, as shown in service at a colliery in Northumberland, will ensure increased economies wherever it is installed.

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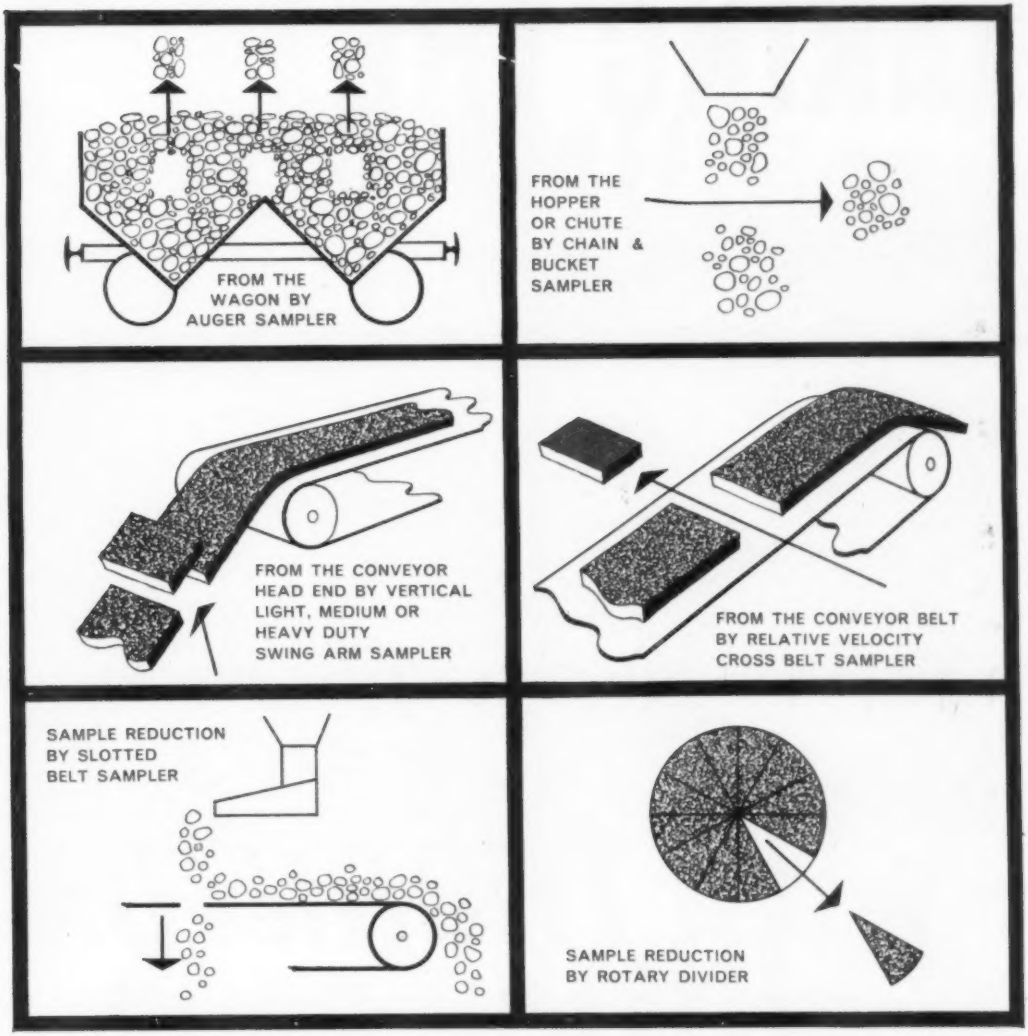
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In this 5 stand 14 in. cross country mill, pneumatically operated lifting rollers used in conjunction with inter-stand transfer gear, greatly reduce the manual effort required. The transfer gear enables one man with little effort to move heavy loads between stands. The friction driven lifting rollers bear the weight of these special steel bars of up to 7 ins. square. A single operator can handle heavy white hot loads at increased speeds—with increased safety.

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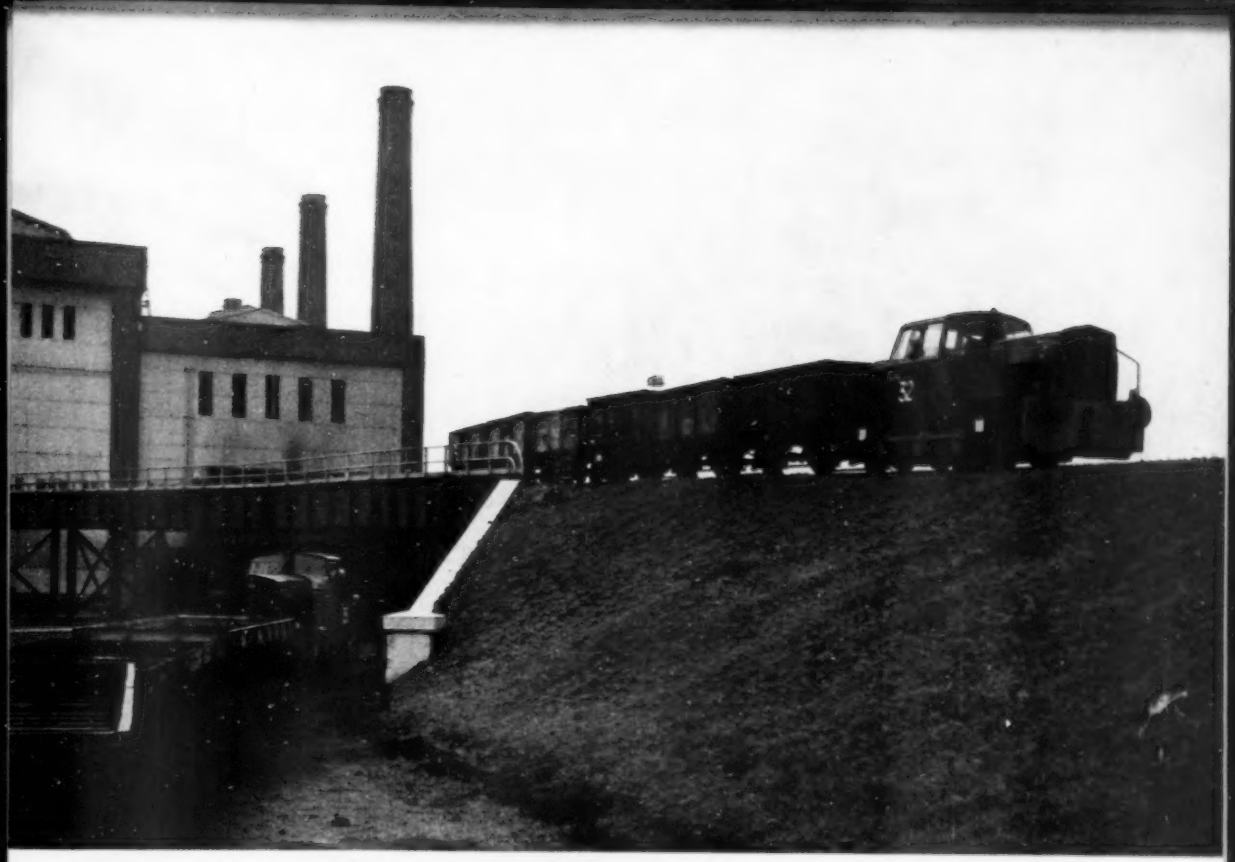
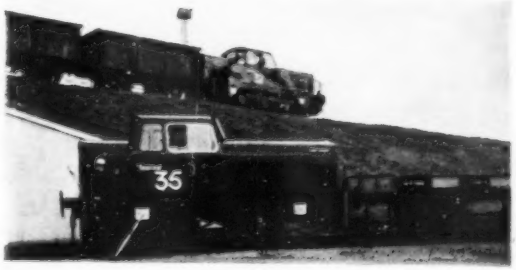


Performance **Visibility** **Control**



Photographs by courtesy of Dorman Long (Steel) Ltd. Lackenby Works.

Sentinel 0-6-0 and 0-4-0 Industrial Locomotives are powered by Rolls Royce diesels with Rolls Royce Hydrokinetic Torque Convertors (Twin Disc license) giving continuously variable transmission ratio up to 5·2:1. Maximum tractive effort 0-6-0, 29,300 lbs, giving haulage capacity of 445 tons @ 10 m.p.h. on level & 176 tons @ 3 m.p.h. on 1 in 30 grade. Maximum tractive effort 0-4-0, 22,600 lbs, haulage capacity 378 tons @ 10 m.p.h. on level & 133 tons @ 3 m.p.h. on 1 in 30 grade. Brakes and control gear power operated, dual control. Completely unrestricted vision in all directions making for complete safety of operation.

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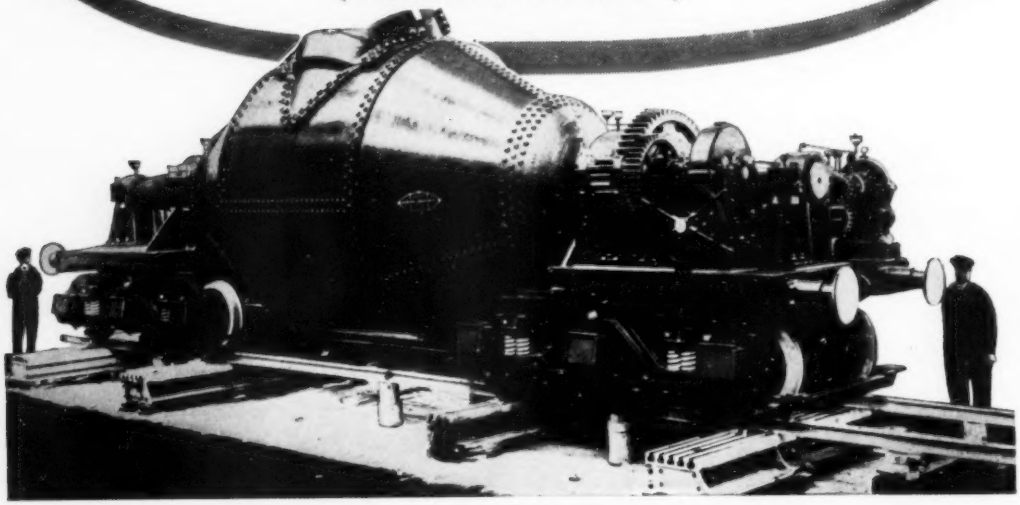
1A

Hot Metal Mixer Cars
(PATENTED)



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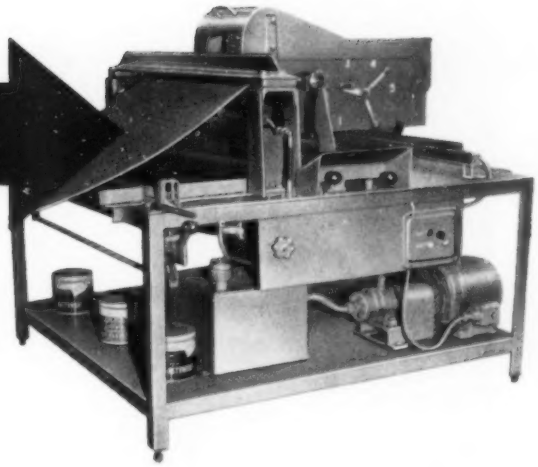
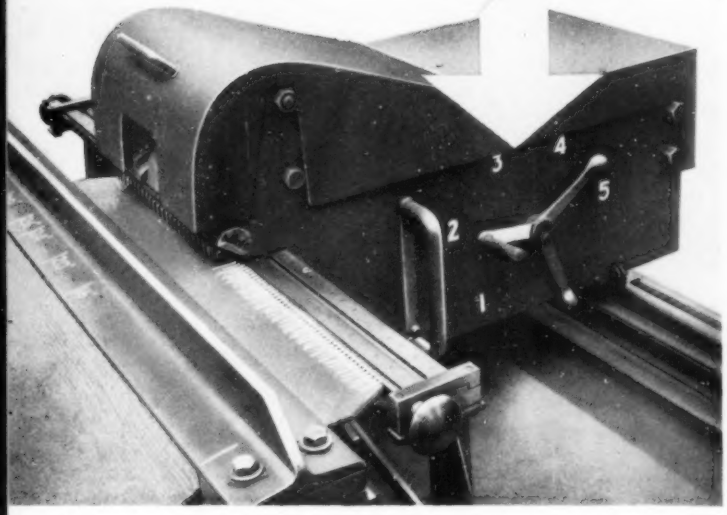
Comet LEVIATHAN

BELT FASTENING BY NUMBERS

Hydraulic Belt lacing Equipment



FOR COLLIERY BELT WORKSHOPS



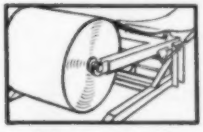
Ease, Speed and Simplicity of operation Belt-end is securely, mechanically held; ensuring perfect alignment of hooks. Hydraulically-operated jaws (adjustable to thickness of belting) ensure perfect clench. A 42" belt takes 5 minutes to joint....calls for *no* effort!

Mechanically Perfect Joint
As the hooks are always absolutely in line, and every hook correctly clenched, it is impossible to make anything *but* a perfect joint—which *must* last longer!

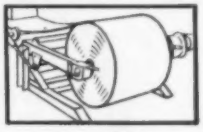
Wide Range 'Leviathan' is versatile. Takes any belt-width from 16" to 48". Any thickness of belt from ¼" to ¾". You can operate the 'Leviathan' a full working week without wasting a single hook!

Eliminates Operator Fatigue Leviathan provides *all* the power needed. The operator only controls it, and is still working as efficiently at the end of the day as during his peak period. Full utilization of machine, lower cost per joint *must* follow.

Complementary Equipment



UNCOILING HEAD
Hydraulically operated to lift coil clear of ground.



COILING HEAD
Electrically operated, re-coils belting after joint is made.

Every responsible colliery executive will naturally be interested in this latest development and is cordially invited to see it demonstrated at our factory.

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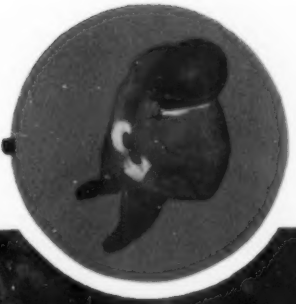

HUWOOD *Slung Structure*

Much of the present-day demand for conveyor structure which can be suspended from the roof has been created by the availability of Huwood Slung Structure—the first choice of a growing number of those mining engineers whose judgment in such matters is sharpened by day-to-day experience.

In common with many other Huwood elevated structures for use in gate and trunk roads, Huwood slung structure is based on the F.T. section which is fitted throughout with Huwood self-lubricating oil-filled rollers and is one of the most robust and serviceable conveyor sections used in present-day mining.

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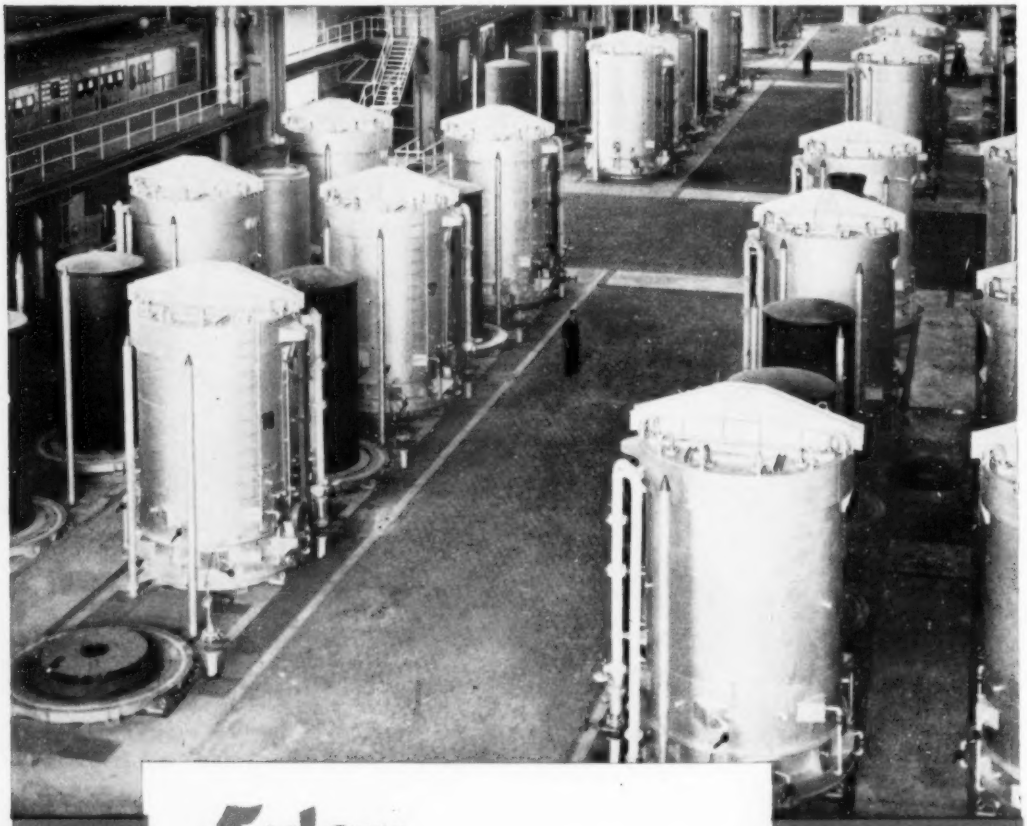
1B



Salem for many years builders of modern multi-stack coil annealing plants now offer in collaboration with Messrs. Matthias Ludwig of Essen, the most up-to-date single stack coil annealing plants for both sheet and tin plate. More than 300 furnaces installed during the last 10 years.

Salem design, build and put into operation complete plant with all ancillaries.

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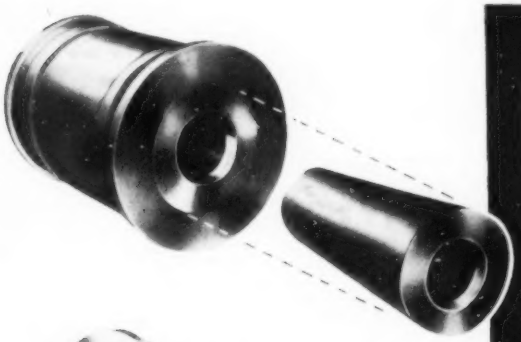
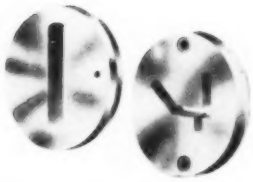
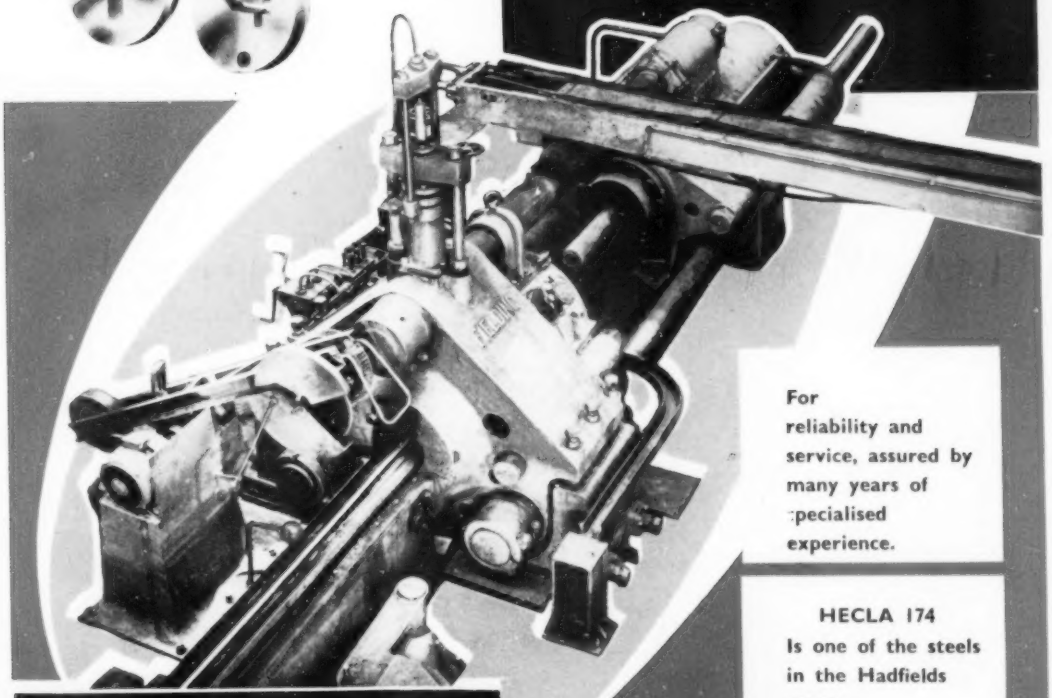


EXTRUSION PRESS COMPONENTS





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HECLA 174
Is one of the steels in the Hadfields range.
Particularly suited to withstand rapid cooling between operations.

HADFIELDS SHEFFIELD

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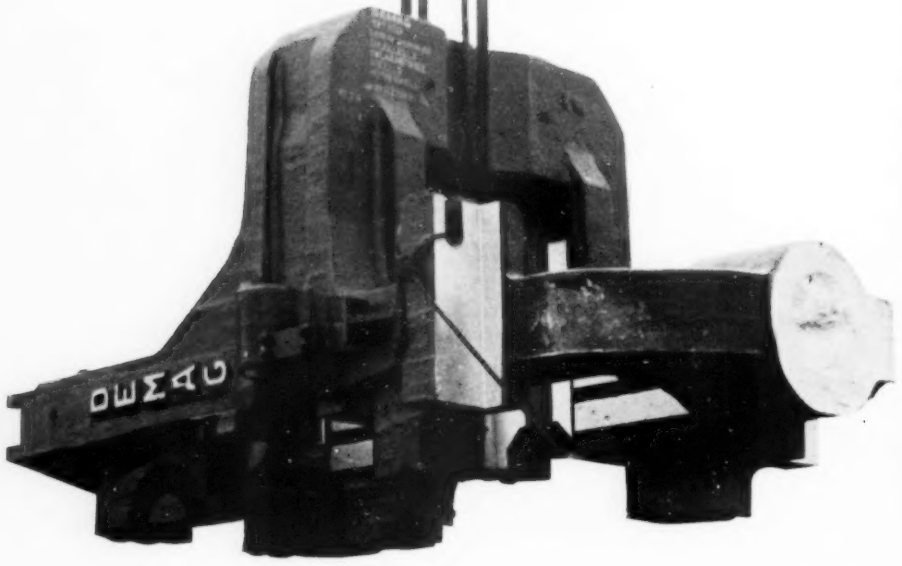
THE LANARKSHIRE UNIVERSAL BEAM MILL



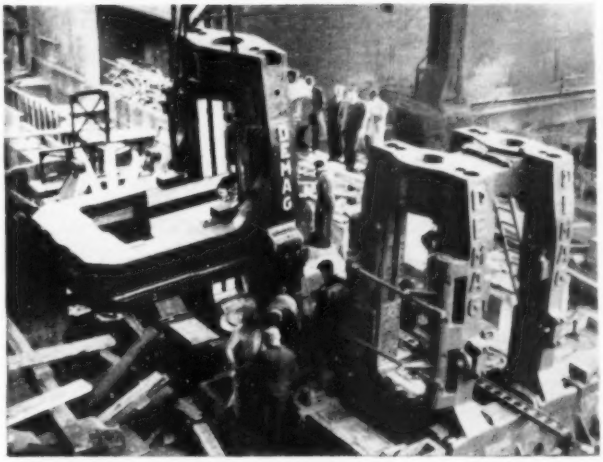
At Motherwell, the steel centre of Scotland, the Universal Beam Mill is at an advanced stage of construction.

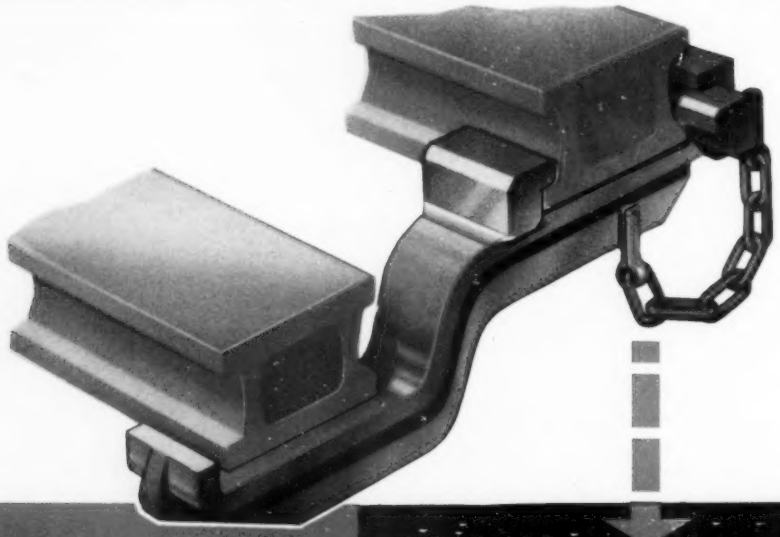
When the new mill comes into operation the Lanarkshire Steel Company will be producing a wide range of Universal beams and columns for various structural uses in Britain and overseas.

The Lanarkshire Steel Co. Ltd.

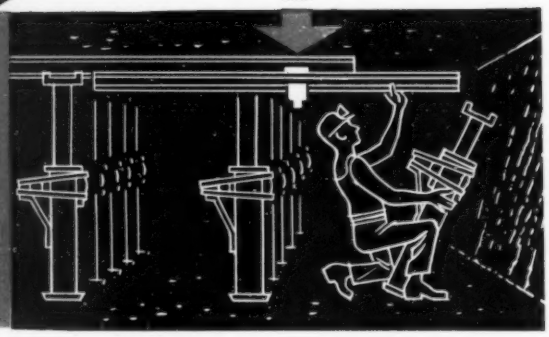
MOTHERWELL SCOTLAND

One of the Colville Group of Companies





the BECORIT slide bracket



reduces work and saves time

The Becorit Slide Bracket has been designed for use with stagger-bar systems of support particularly with reference to prop-free front faces. The bracket eliminates the necessity for bars to be lowered to the ground and lifted again and therefore reduces work in support setting and saves time.
It is erected quickly, is extremely robust and is suitable for use on all Groetschel Section Bars.
Brackets can be made to fit any section.

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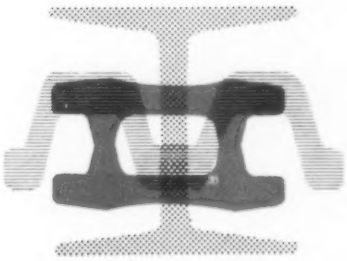
the GROETSCHEL K. 45 Roof Bar

This Bar in an entirely new section, is made of the same special alloy steel as other Groetschel roof bars. It can be used for face or roadway support. It is ideally suited for slide bar and stagger bar systems. It's advantages include great strength for a comparatively shallow section and suitability for thin seam work.

These bars can be supplied with fixed prop locations and in sections up to 15 ft. long. The Groetschel K. 45 Section is twice as strong as W. Section in vertical bending for comparable weight.



Patents Applied for.

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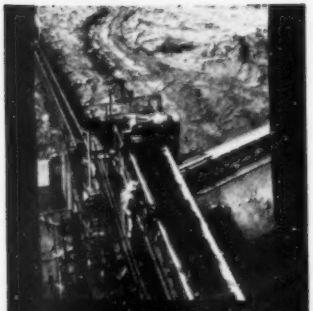
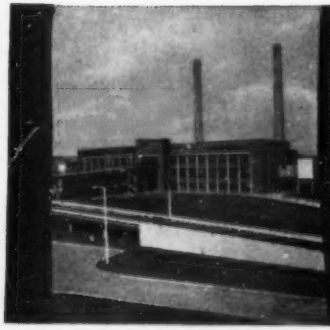
130, 886, 134 TONS of ABRASIVE COPPER IN 12 YEARS has been moved by the Chilean Exploration Co. using U.S. Rubber Belting which steadfastly resisted both abrasion and exposure to the sun.

Moving Facts



500 TONS of PHOSPHATE AN HOUR is conveyed down this rugged mountainside in Georgetown, Idaho, U.S.A. by a mile-long U.S. Rubber Conveyor Belt.



450,000 TONS of REFUSE IN A YEAR is the "payload" of this mile-long stretch of U.S. Rubber Belting in operation at the Glasgow Corporation's refuse disposal plant at Polmadie.

These are the facts to convince you—tough, reliable U.S. Rubber Conveyor Belting can really take the strain under the most rugged conditions, the most punishing loads . . . outliving all competitors by thousands of working hours, positively *refusing* to wear out wherever it's on the job! Speak to the experts at North British about your conveying problems.

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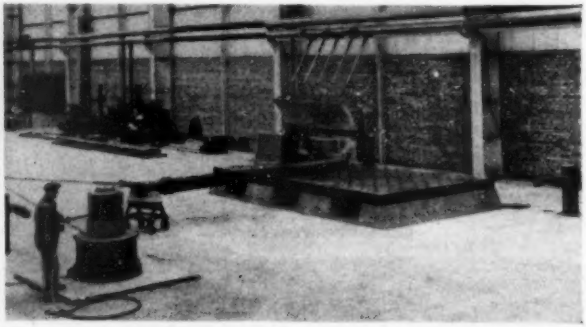
CAPSTANS



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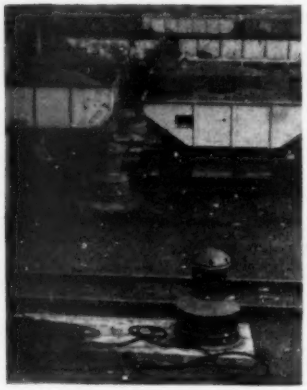

15-ton "Above ground" type.

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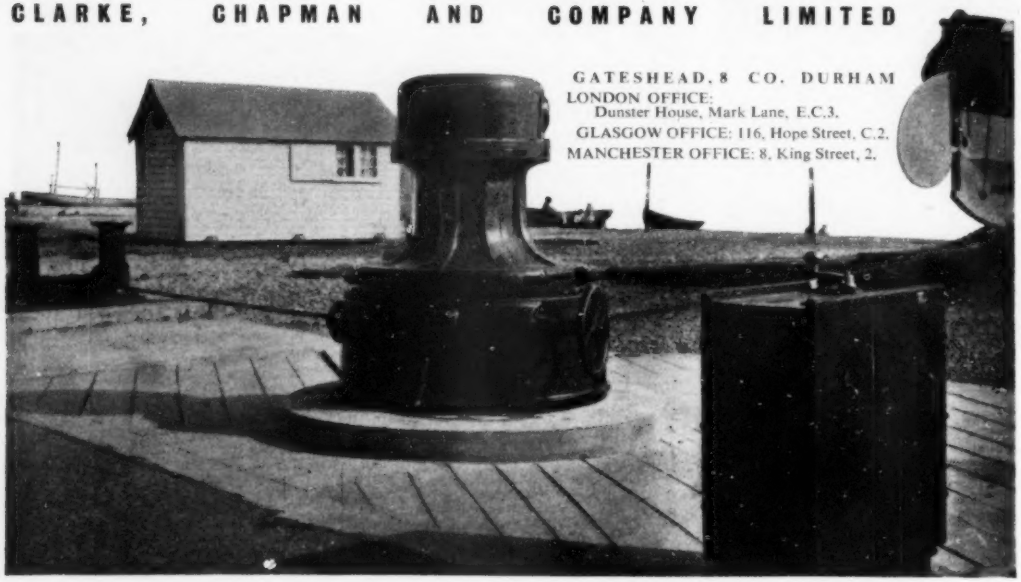
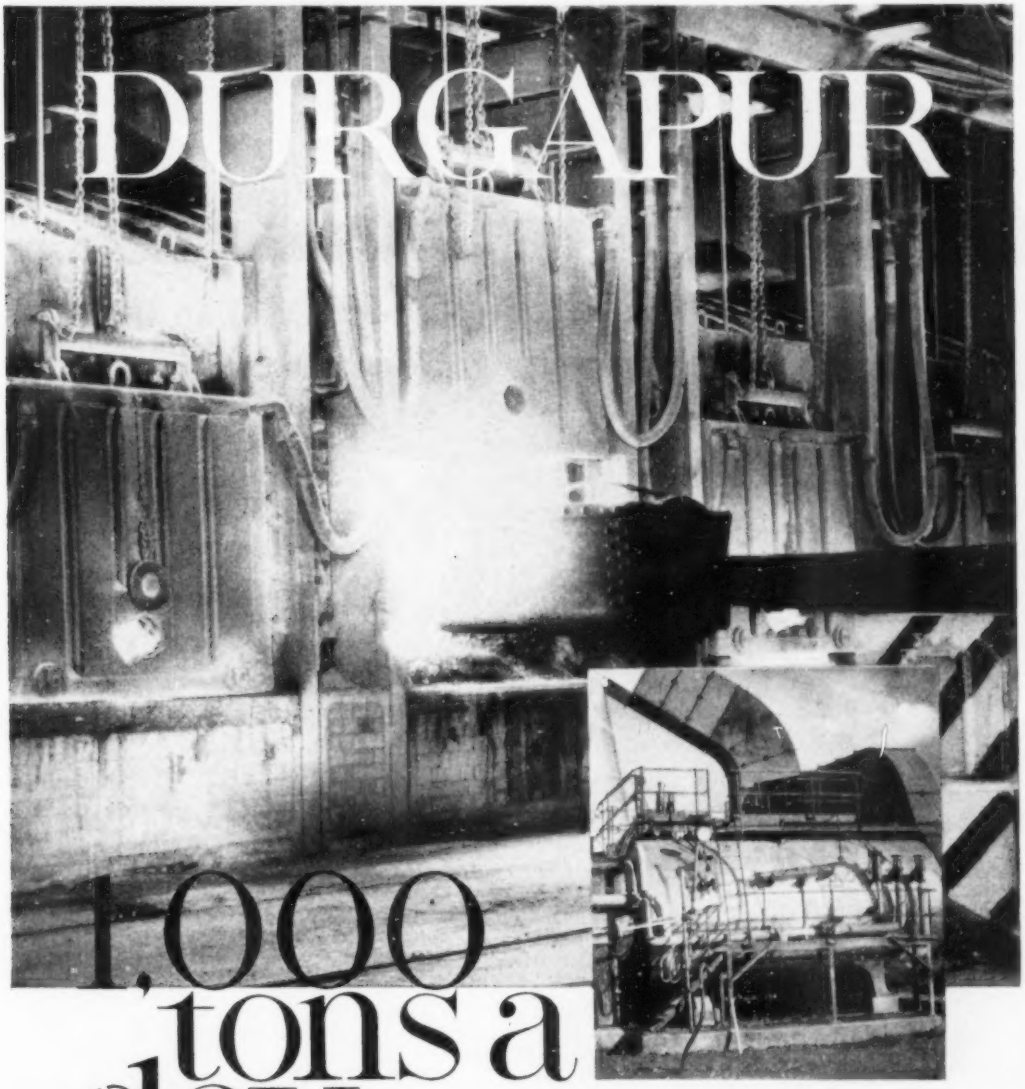


L/8



1,000 tons a day

but not only of steel. This is also the amount of steam generated by S-B-C waste heat boilers at Durgapur. The Spencer Bonecourt boiler shown above, inset, and six others like it, produces from 10,000 to 20,000 lbs of steam per hour—at 200 lbs per sq. in. S-B-C waste heat boilers were chosen by The Wellman Smith Owen Engineering Corporation Ltd., to operate in conjunction with their 200 ton open hearth melting furnaces for Indian Steelworks Construction Co. Ltd.

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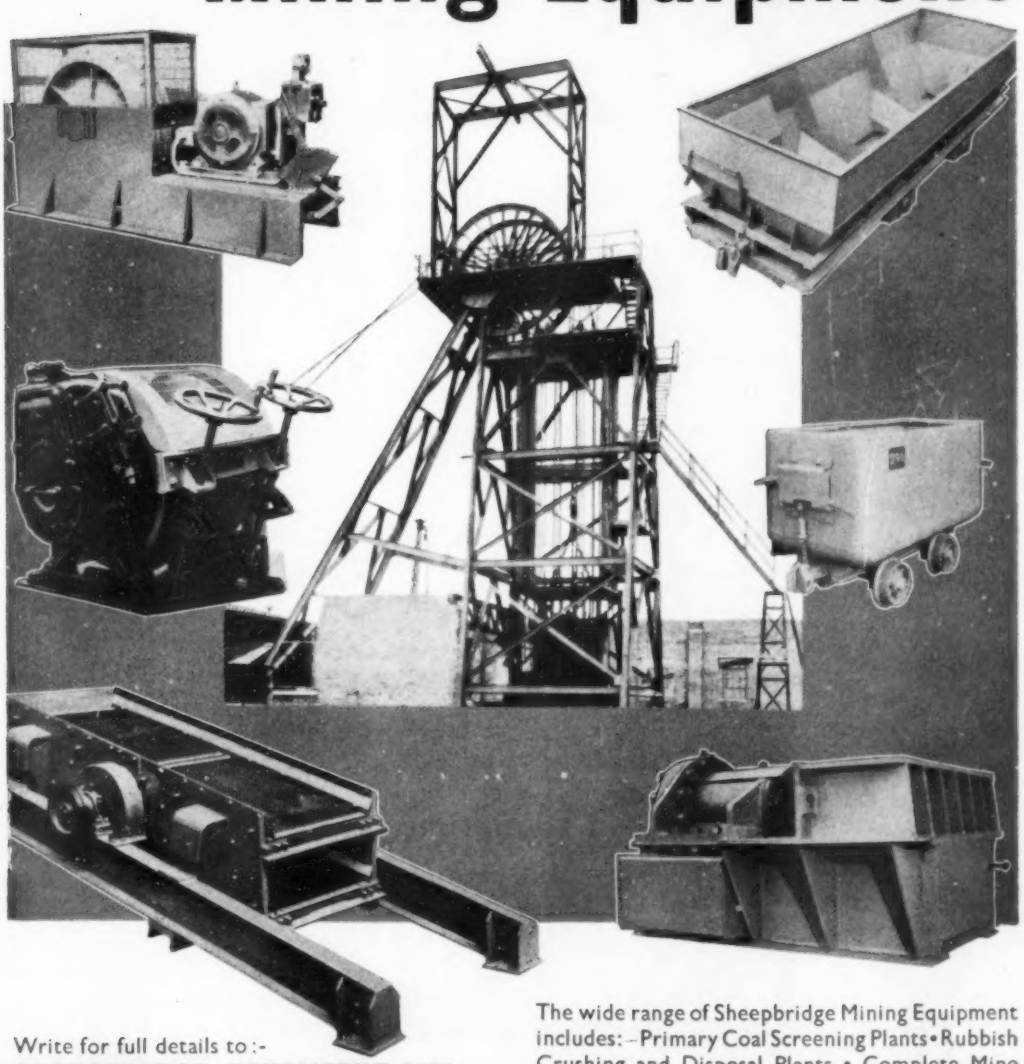
for GOOD Mining Equipment



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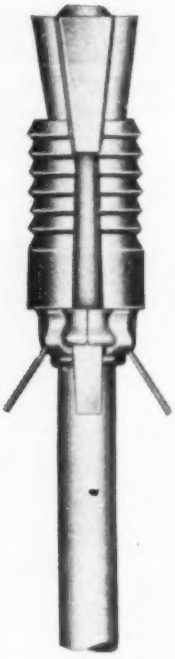
WITH BJB ROOF BOLTS



Much faster to install than less modern types of roof support, BJB Roof Bolts can cut support costs by up to 30%. Forged from high-strength steel (min. breaking strength for ¾" bolt 15 tons) BJB Roof Bolts have an unequalled safety-in-service record. Well over a million are already hard at work supporting the roofs of mines and tunnels all over the country.

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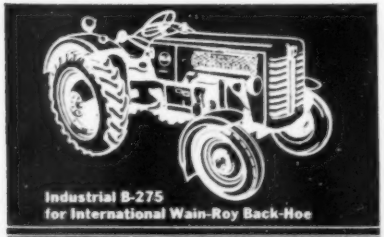
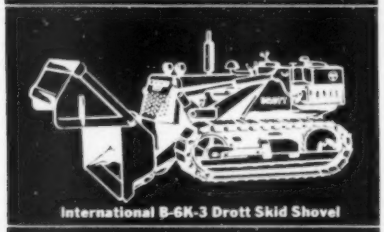
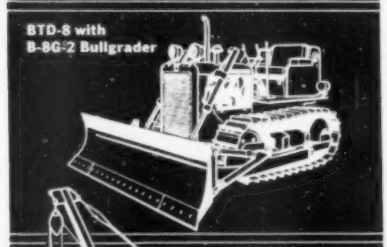
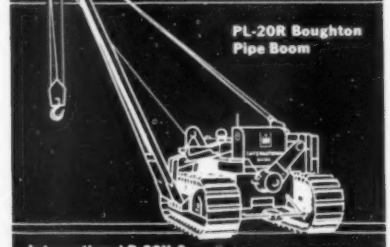
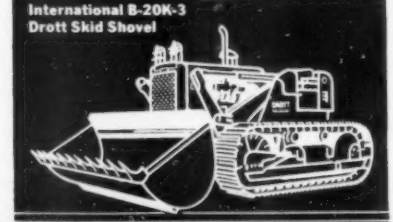
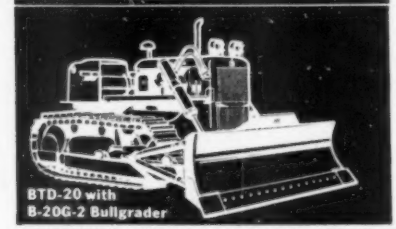

Industrial B-275
for International Wain-Roy Back-Hoe


International B-6K-3 Drott Skid Shovel


BTD-8 with
B-8G-2 Bullgrader


PL-20R Boughton
Pipe Boom


International B-20K-3
Drott Skid Shovel


BTD-20 with
B-20G-2 Bullgrader

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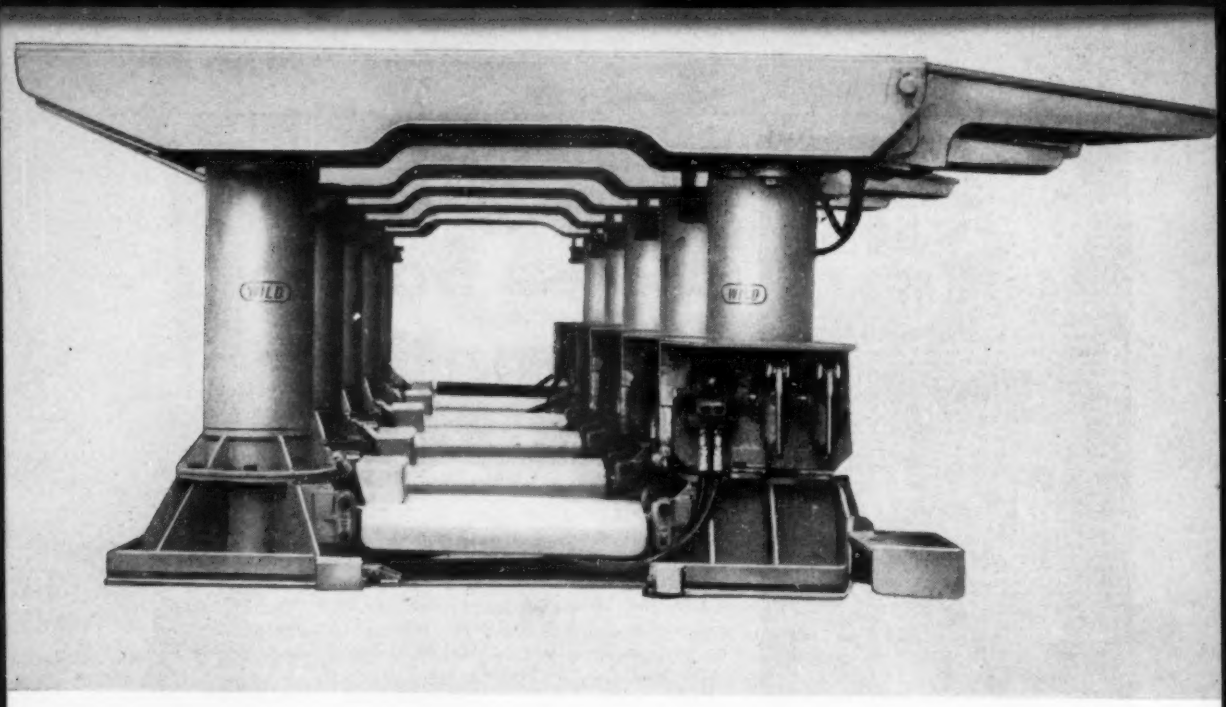
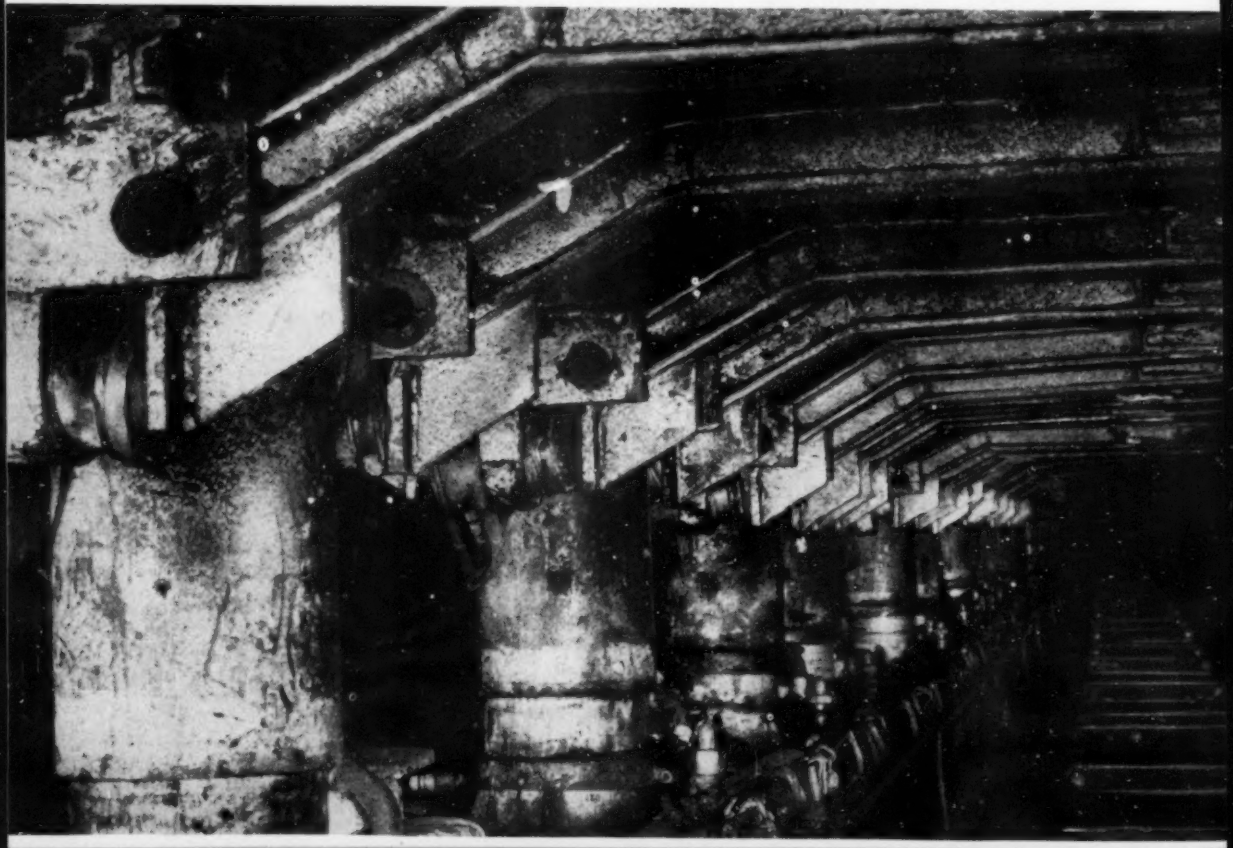


Above:

Goal Post type powered support system, before installation at the face. WILD double-acting rams actuate the units.

Below:

An installation of Gull Wing type powered supports.



SUPPORT SYSTEM

BY WILD

Top: 50 ton thin seam Desford Chock.
Centre: 100 ton Desford Chock with pedestal.
Bottom: 100 ton Desford Chock with ratchet extension and ram.

The Desford range of roof support is now widely used in the coal fields. This equipment is designed to withstand the rigorous conditions underground. It operates on water pressure from the high pressure main or pump and is extremely simple to control; yielding is entirely automatic. Due to simple and robust design maintenance is cut to the minimum and components can be easily exchanged at the coal face in a matter of minutes.

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These Chocks are covered by N.C.B. and WILD patents.

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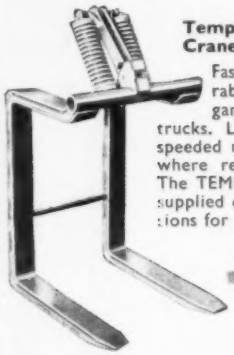

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Short headroom, light weight compact for high efficiency. Capacities from ¼ ton to 20 tons.

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The Sling with 1,000 uses.

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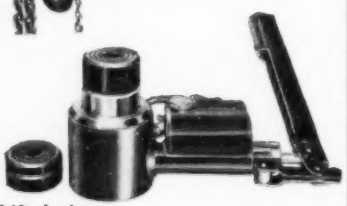

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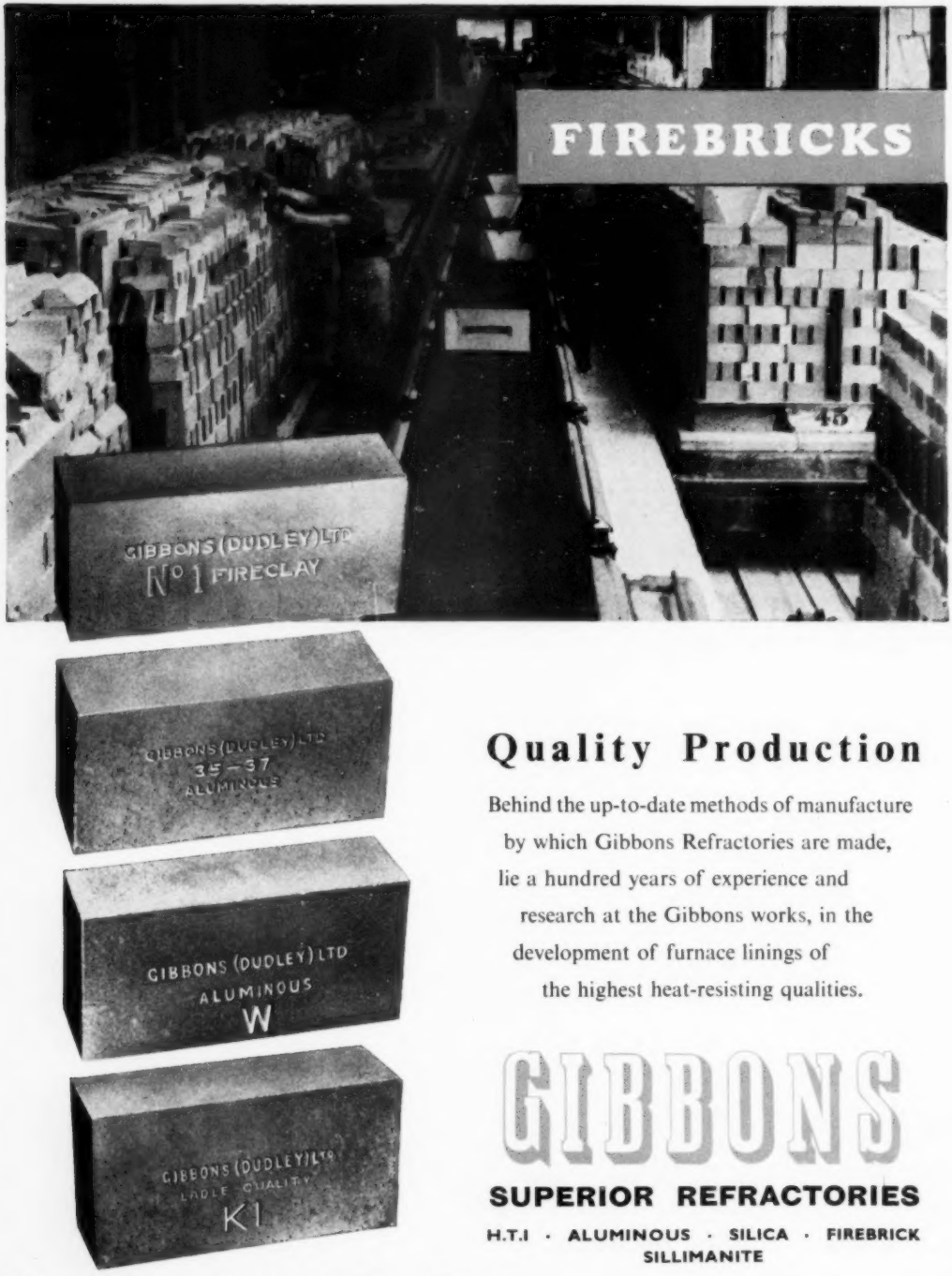

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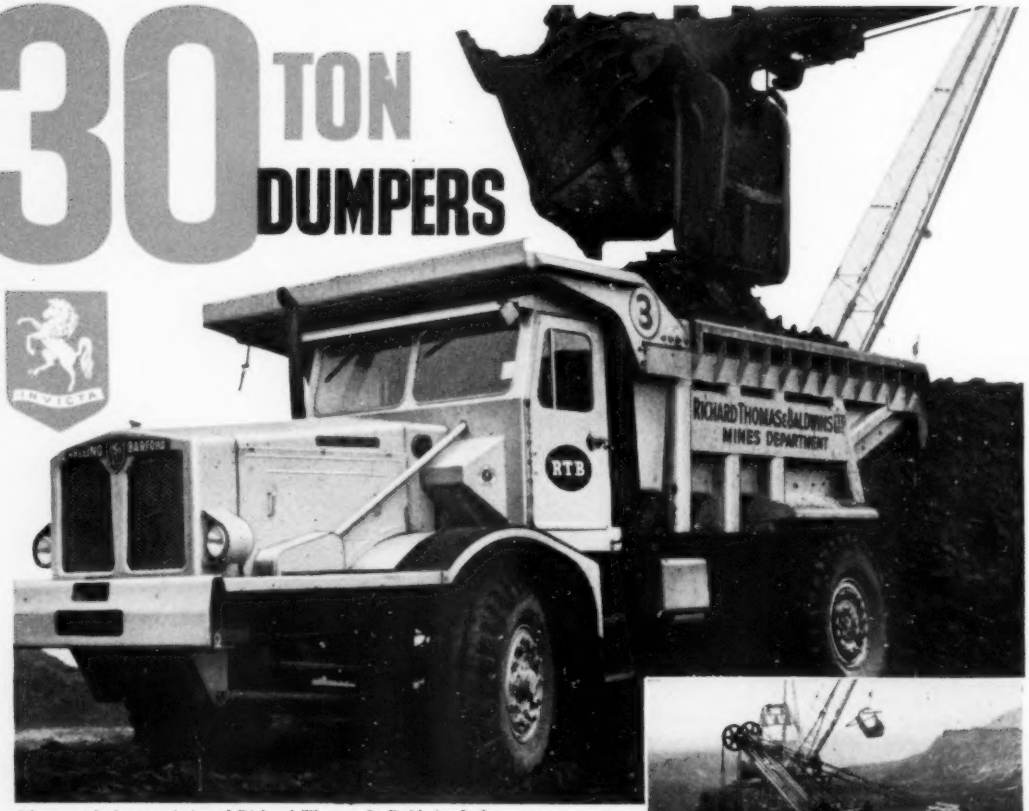

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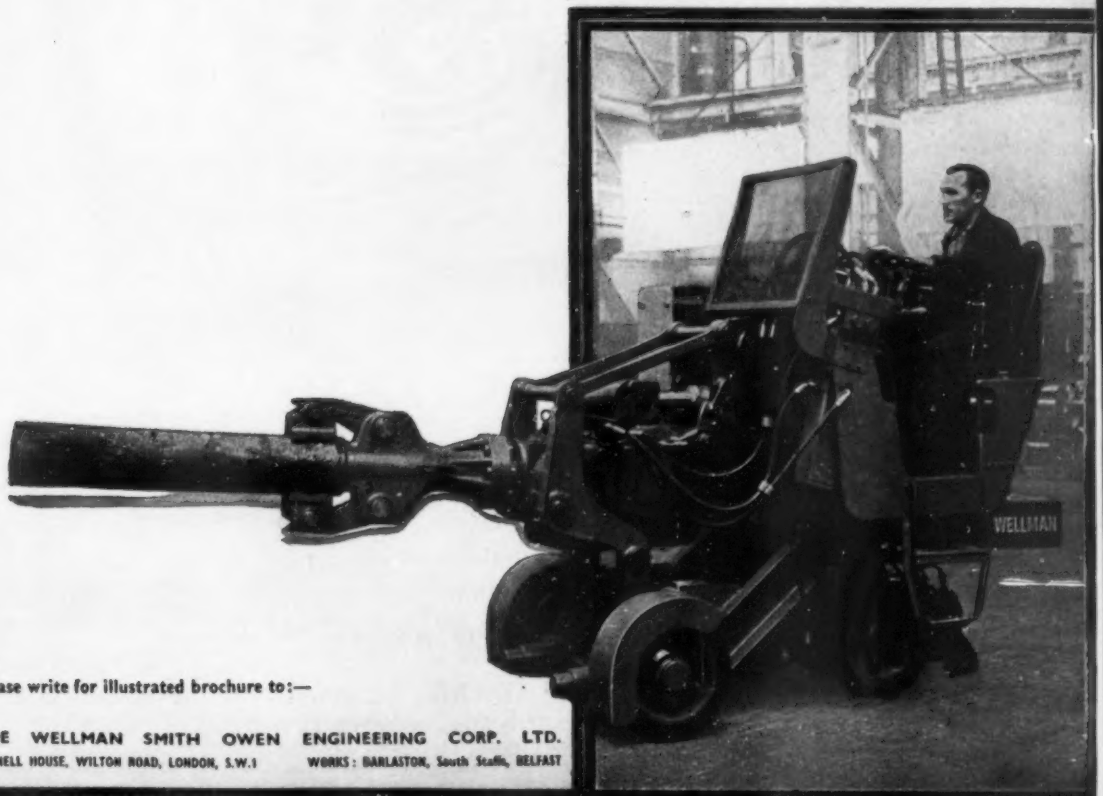
¼ ton Mobile Forging Manipulator specially designed for Small Forges

Fast in Operation. Turns about on its own wheel base. Ensures accurate placing of the billet during forging. Maintains a truly parallel adjustment of the height of the bar during forging. Rotation of the grip head can be stopped accurately in any desired position. Recoils from the forging blow without oscillation thus providing a steady action—essential when forging to close limits. Permits a good view of the workpiece to the driver. Easy access to all parts facilitates maintenance.



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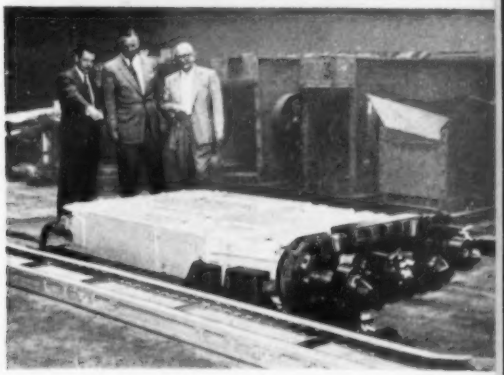


PERFORMANCE

1 Seams 18 in. to 30 in.
2 Depth of cut 4 ft. 6 in. to 4 ft. 9 in.
3 200 tons per shift in 2 ft. 6 in. seam actually achieved.

SPECIFICATIONS

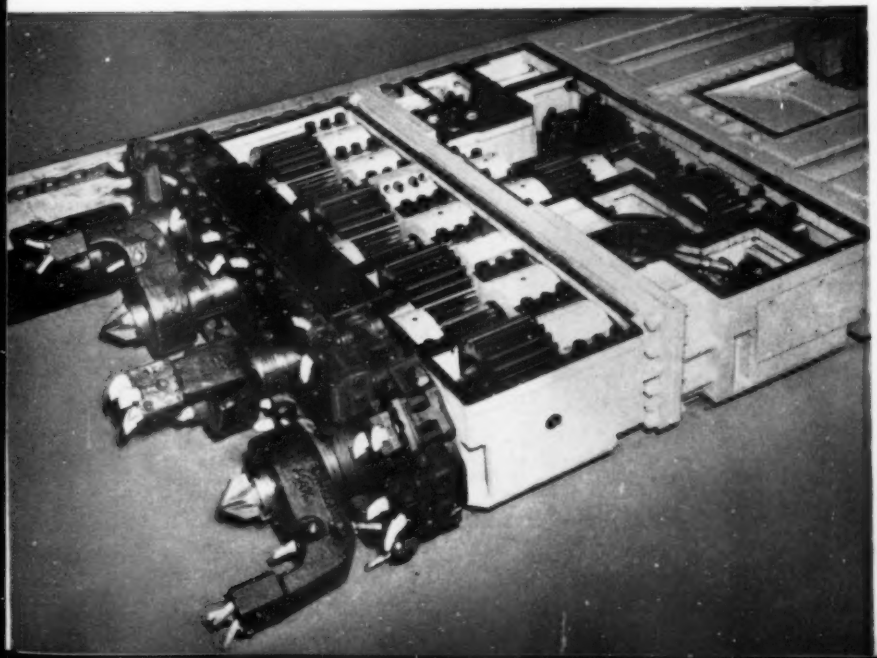
1 Single-ended longwall cutting machine with four boring arms phased at an angle of 72 to each other.
2 Boring arms operated ahead of periphery chain clearing uncut and unloaded coal.
3 Chain includes flight picks bored to ensure complete coal loading.
4 Water jet dust suppression system.
5 Cutting height adjusted by fitting jib inserts.

OPERATION

1 As boring arms rotate coal passes from one arm to next until outer arm loads on to conveyor.
2 Peripheral side cutting chain cleans the coal not loaded by trepanning arms and completes loading.

SEMI-AUTOMATIC CONTROL

Can be fitted with sensing device consisting of gamma-ray source which automatically adjusts vertical height of machine depending upon the relative thickness of coal and rock between the source and the receiver due to preferential scattering by rock as compared with coal.



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— and few fines —

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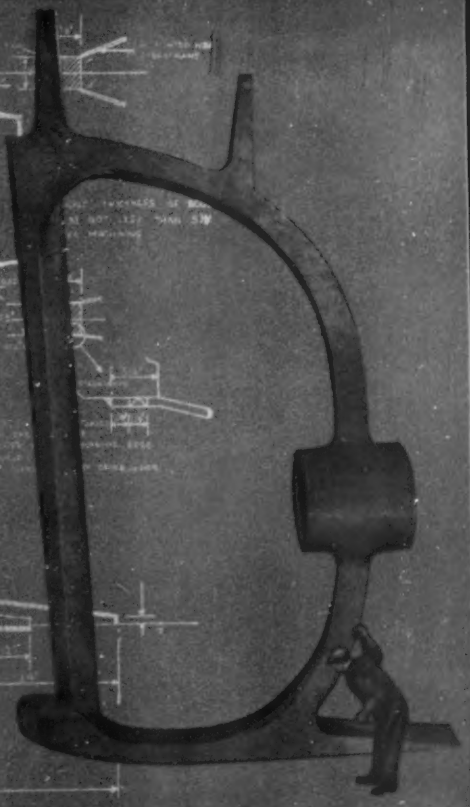

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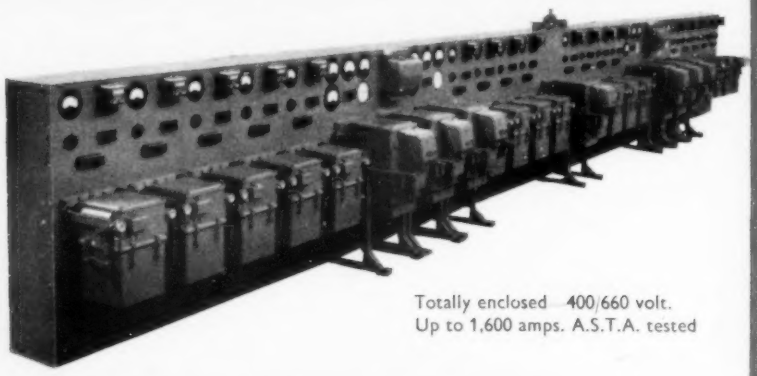

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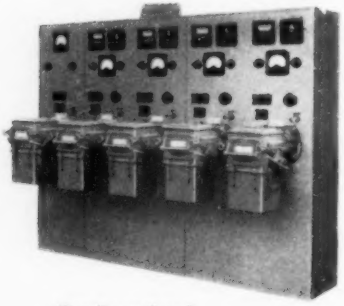
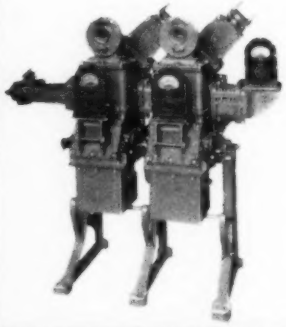
Up to 1,600 amps. A.S.T.A. tested



Totally enclosed
3,300 volt—up to 400 amps.



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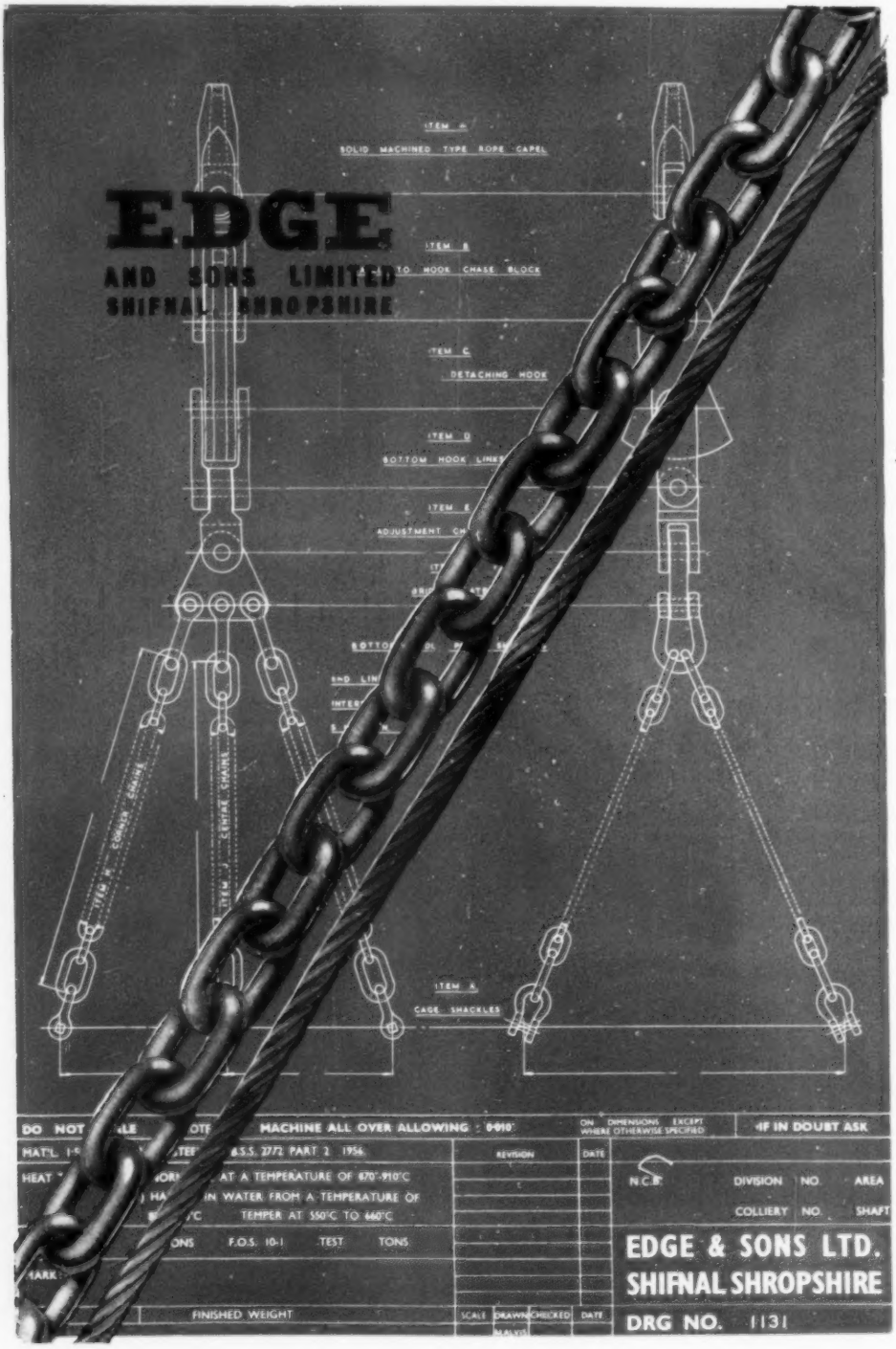
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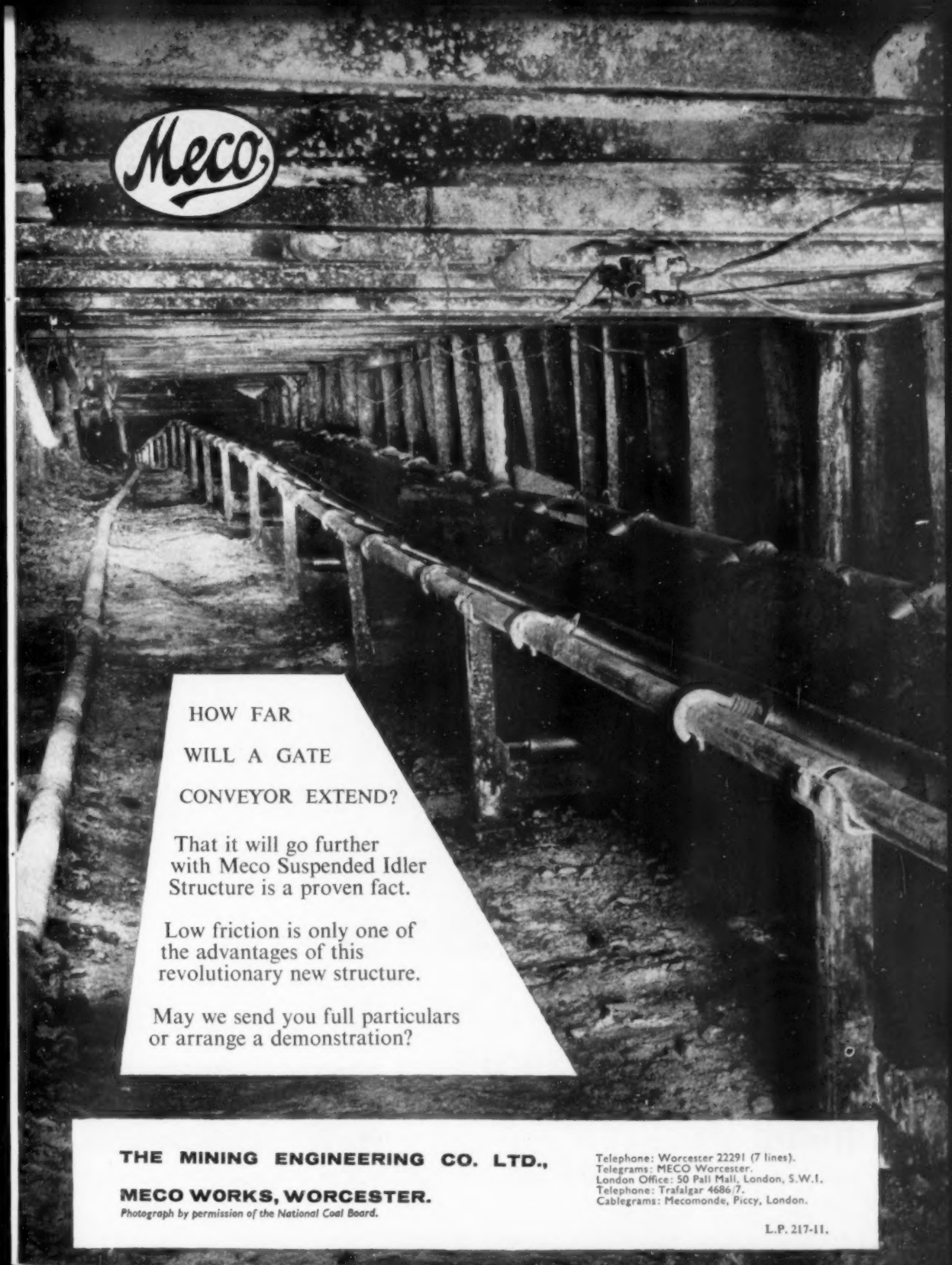
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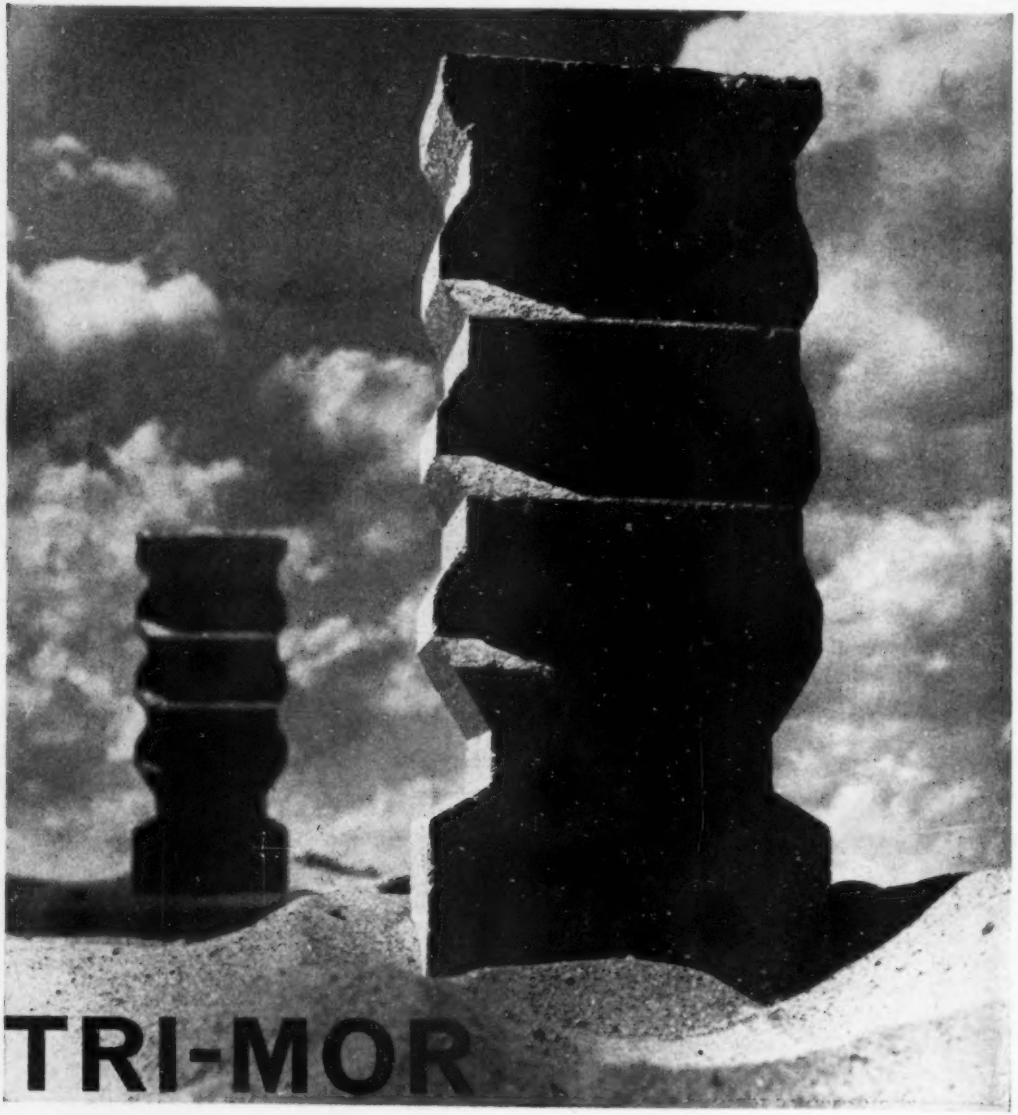

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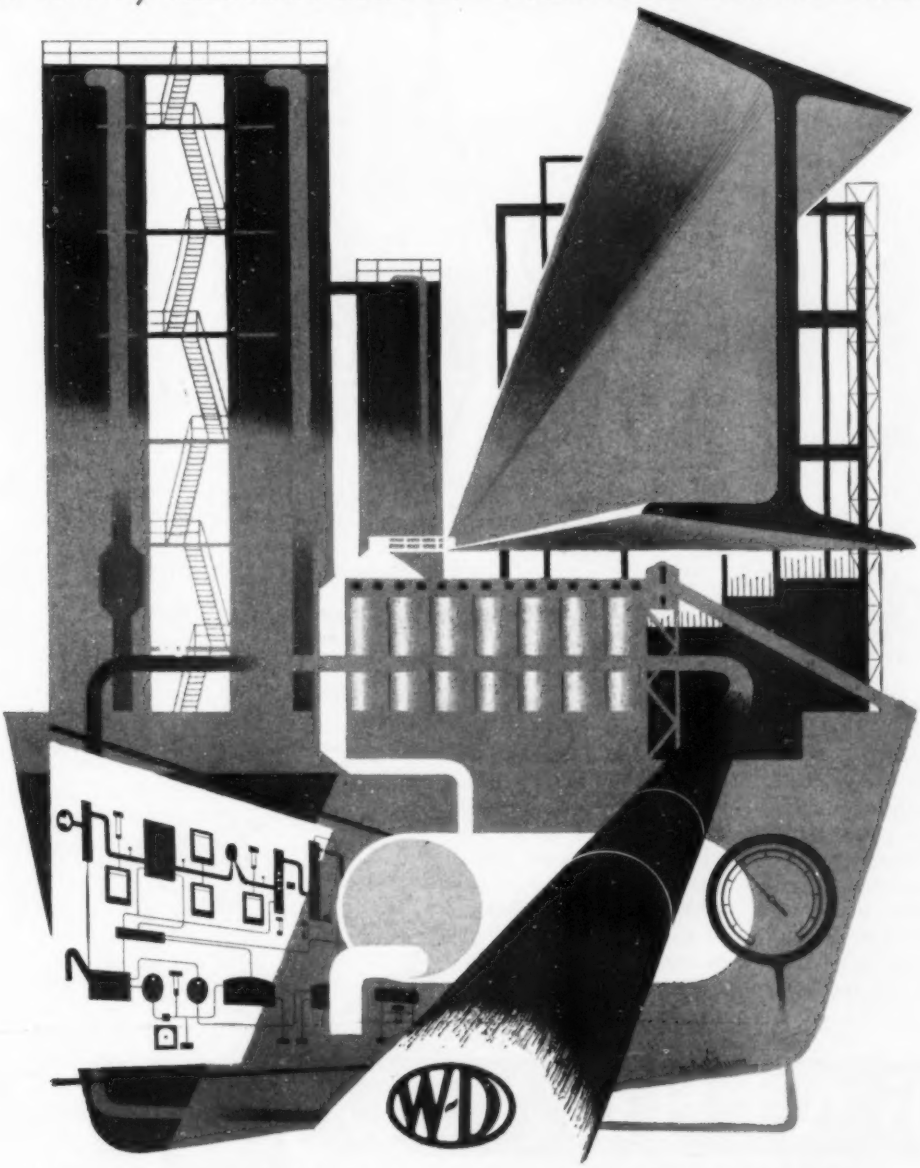

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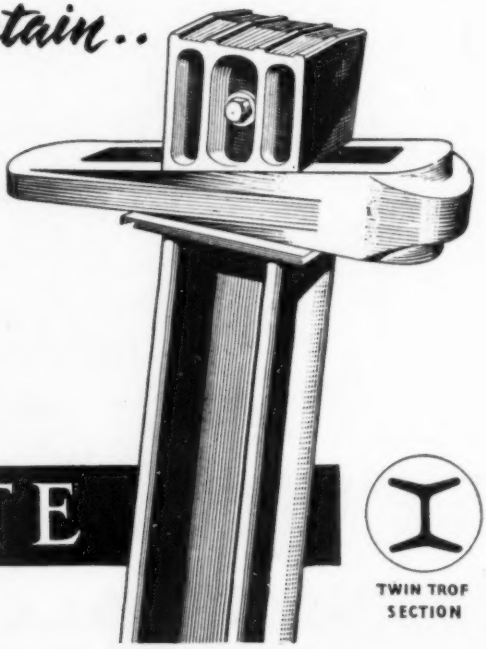

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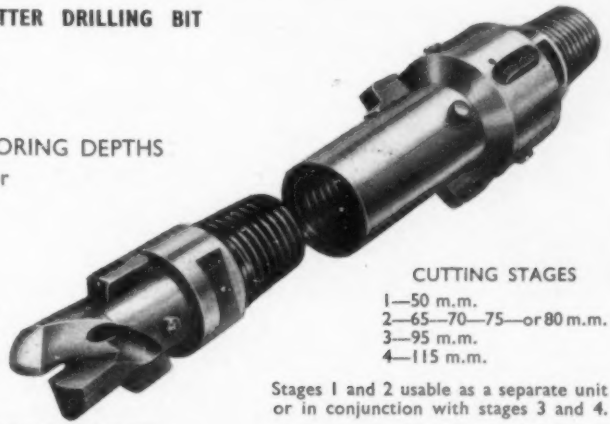

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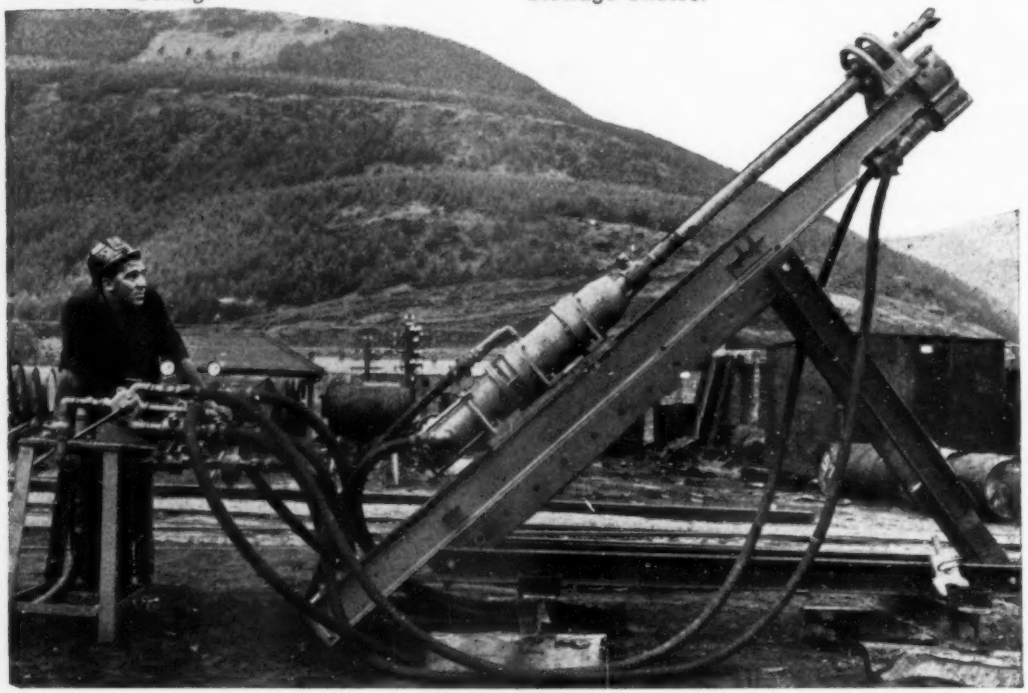

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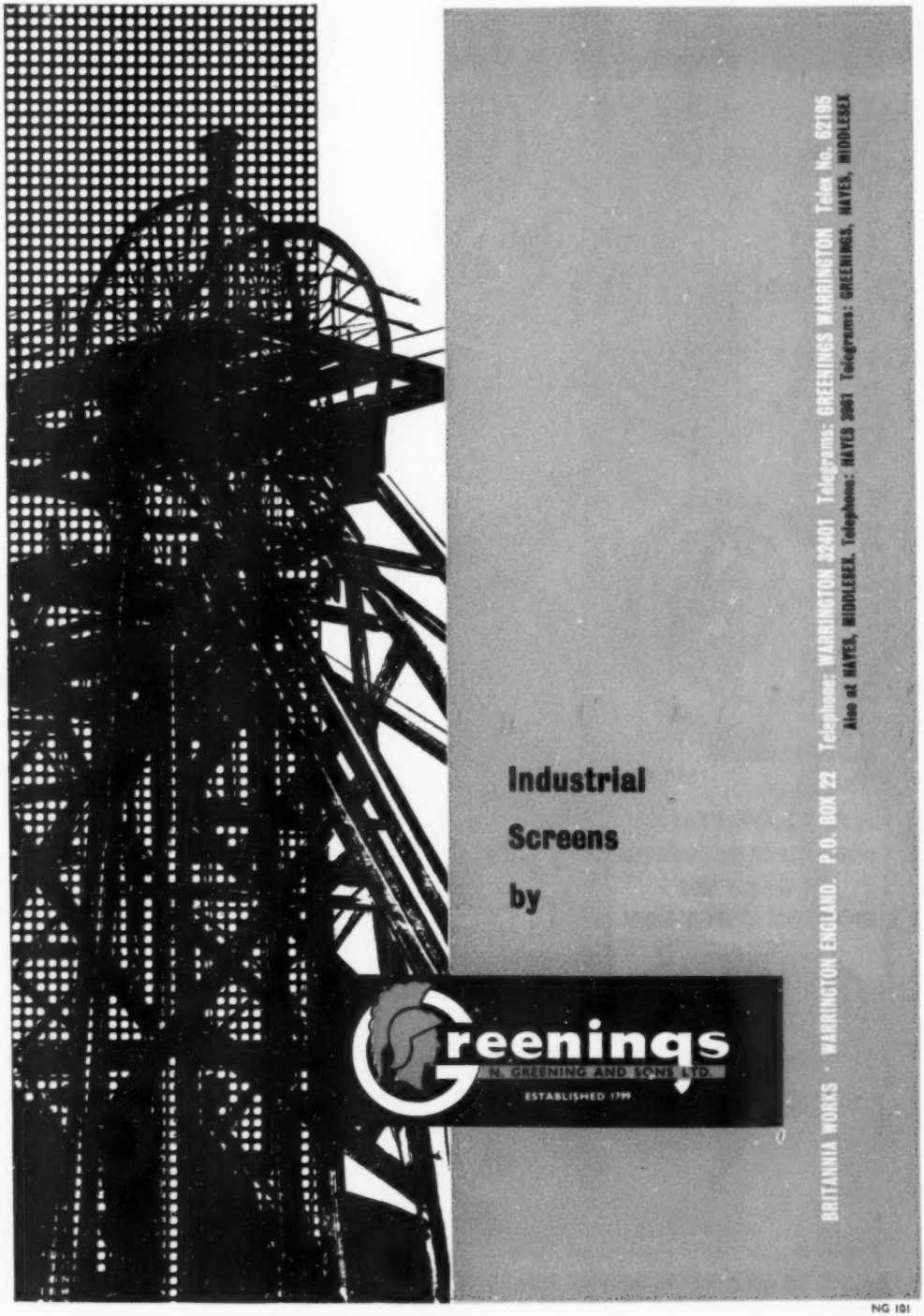
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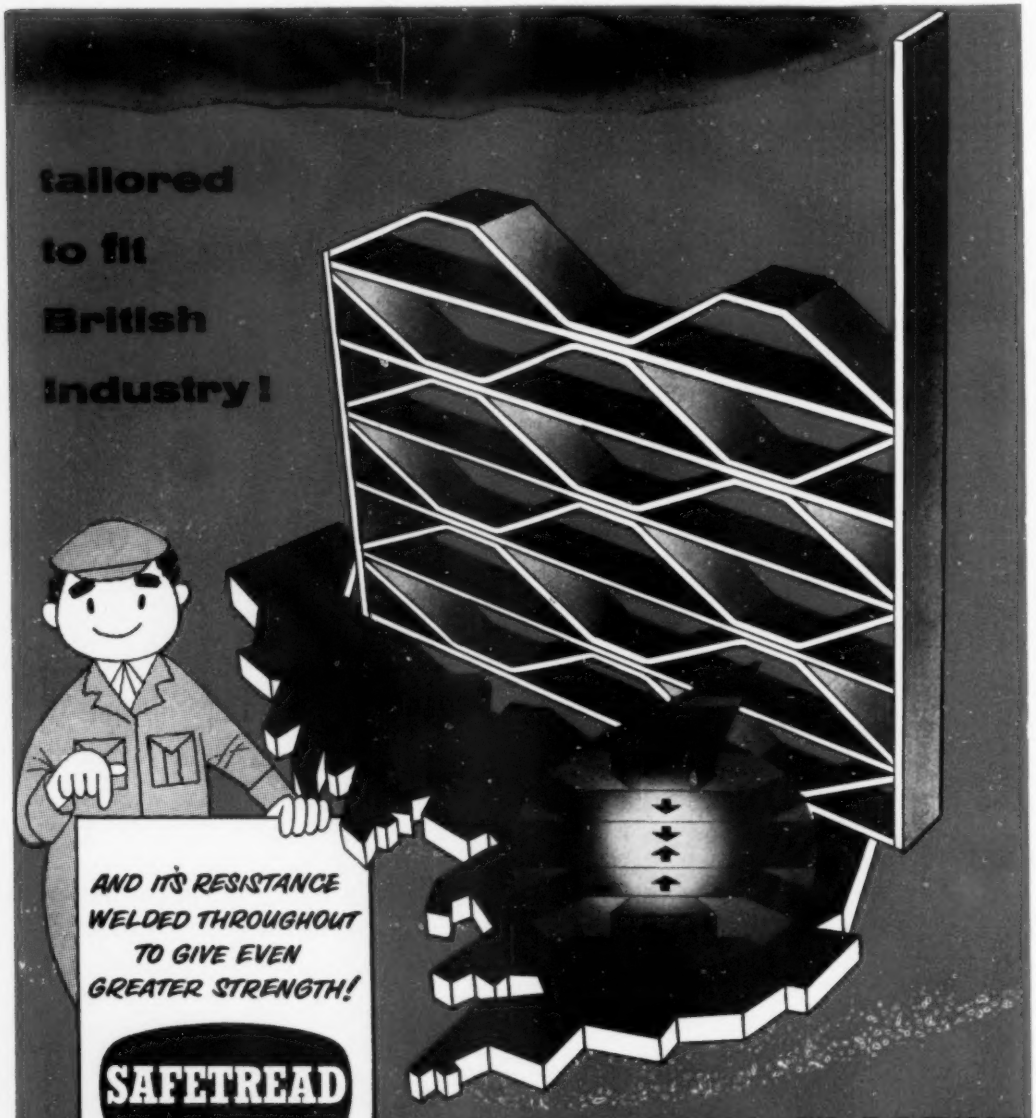

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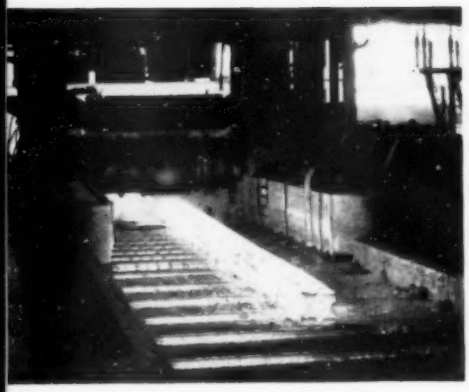

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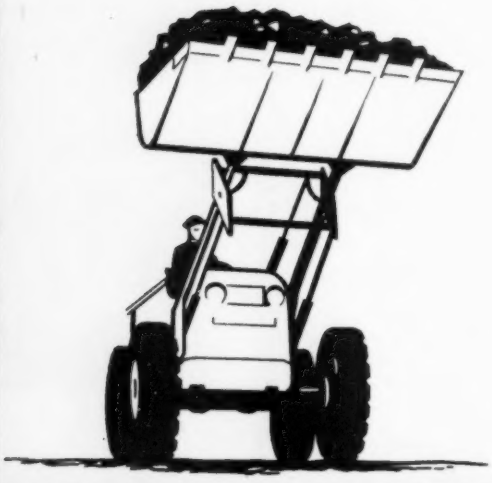

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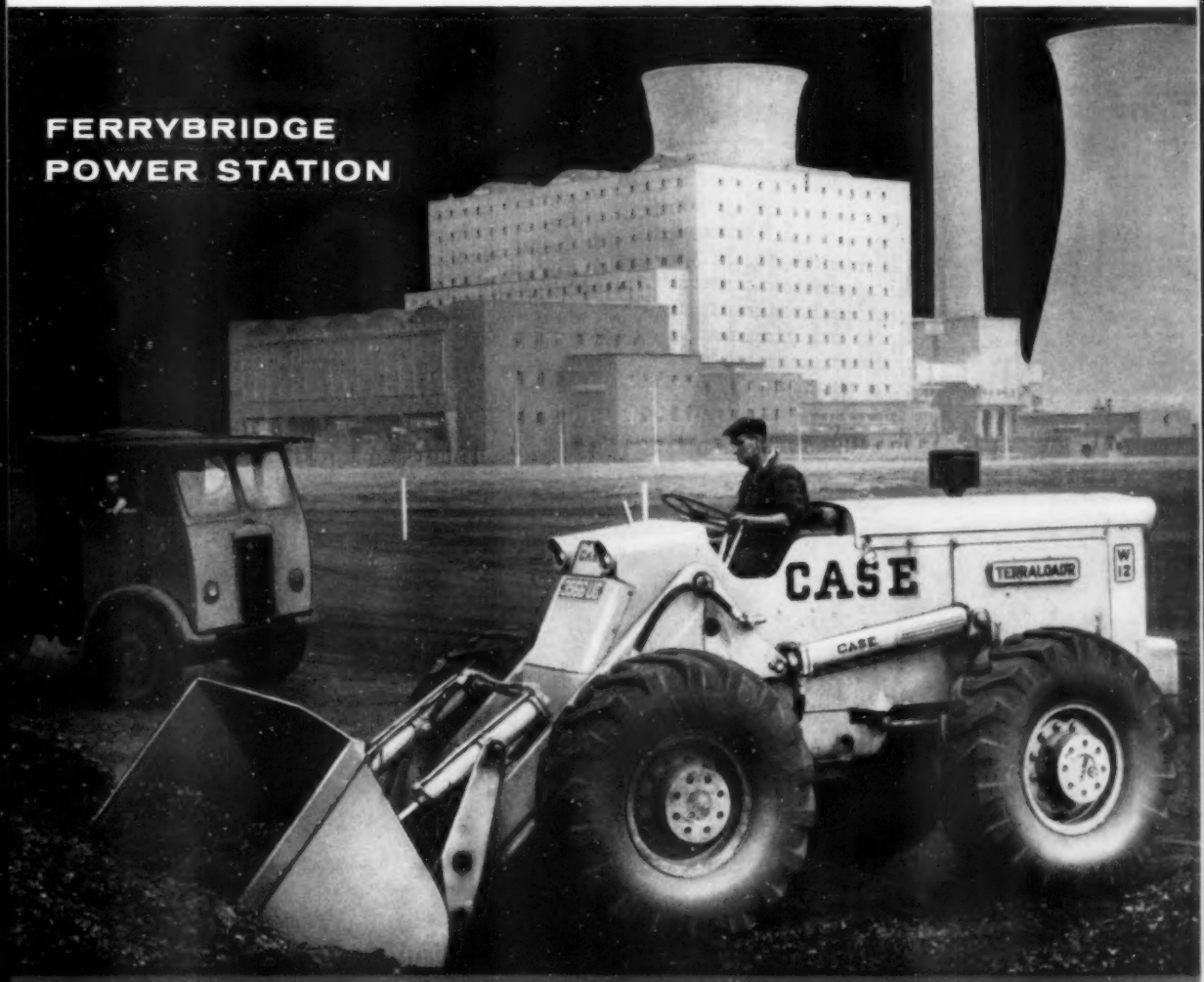

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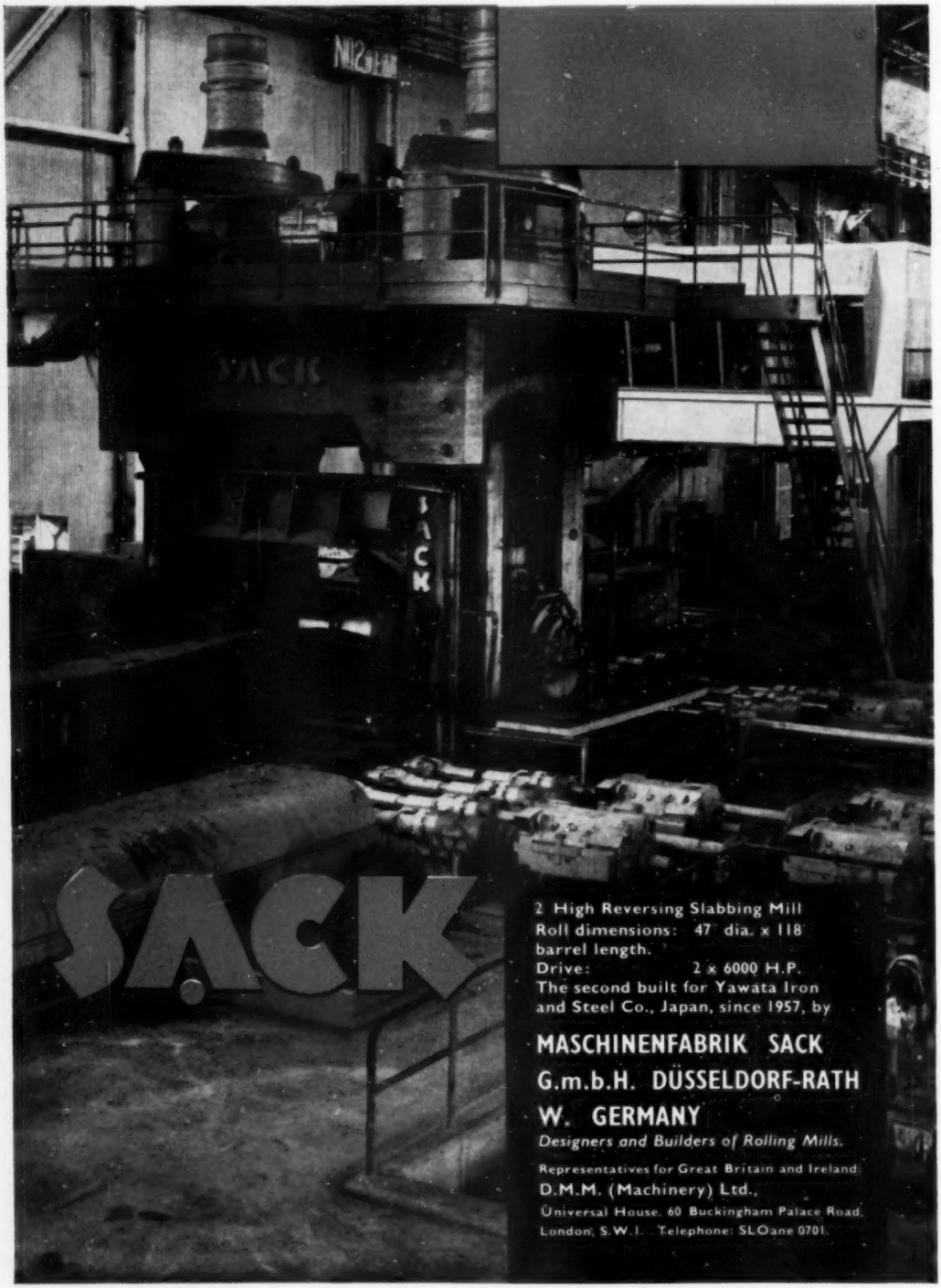

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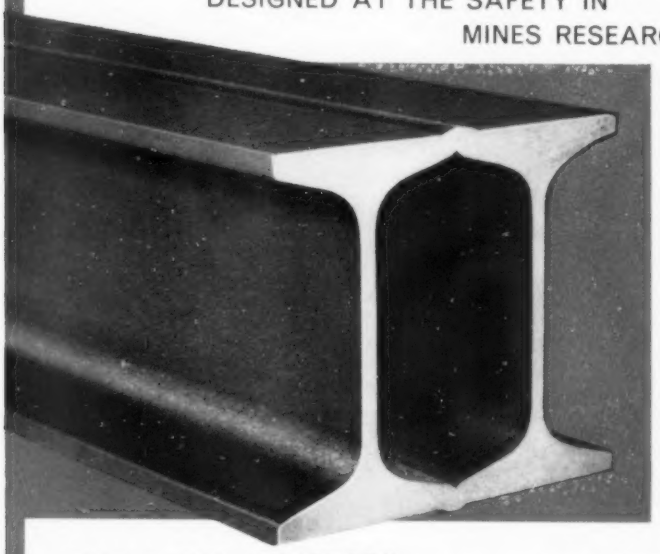

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FAR LONGER PIT-LIFE . . .
FAR GREATER SAFETY . . .
yet approximately the same weight and section as a standard R.S.J.!

The S.M.R.E. Roadhead Bar combines rigidity, stability and a high strength/weight ratio and can be handled as easily as standard R.S.J.'s. The design enables the space between props to be considerably increased to suit the machine layout without risk of crippling the bar.

Two 'I' section R.S.J's to B.S. 968 are welded longitudinally, then hardened and tempered to give high tensile strength.

OFFICIAL UNDERGROUND TESTS

Results of long term trials throughout the country by the N.C.B. have proved the life of the bar as being at least **10 times** that of a similar R.S.J.

FULL PRODUCTION AUTHORISED

The S.M.R.E. Roadhead Bar is fully approved for underground use and is being manufactured by Joseph Wright & Co. (Fabrications) Ltd.

- 45 tons/sq. in. tensile strength
- 340 ton. in. transverse strength (3-point bend over 27½" centres)
- Weighs 16·5 lb. per ft.
- Heat treated steel to B.S. 968
- Low operational cost
- High resistance to lateral bending
- High resistance to twist and crushing
- 4¾" wide x 4" deep twin-web section.

AVAILABLE IN ANY LENGTH

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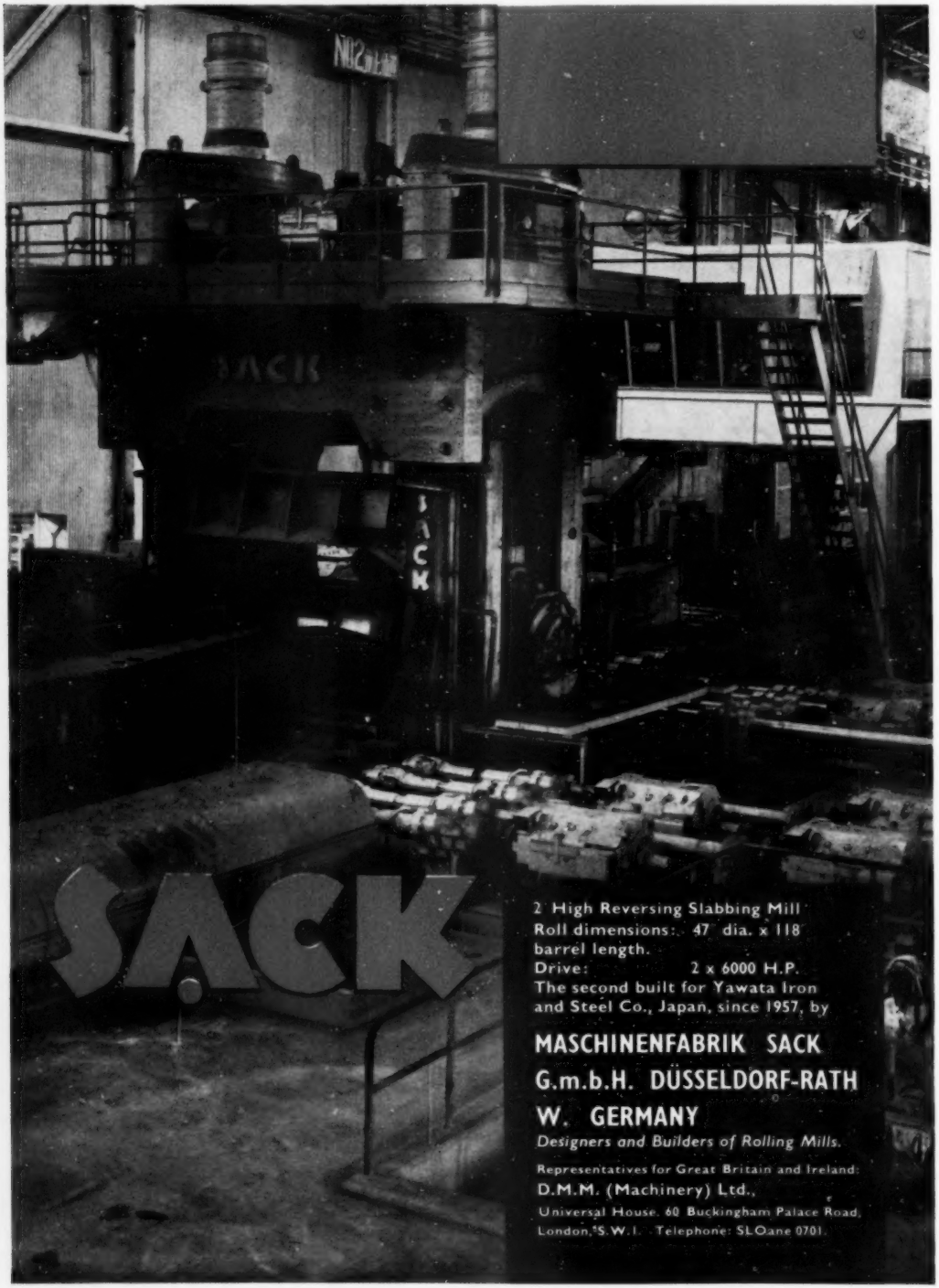
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2 High Reversing Slabbing Mill
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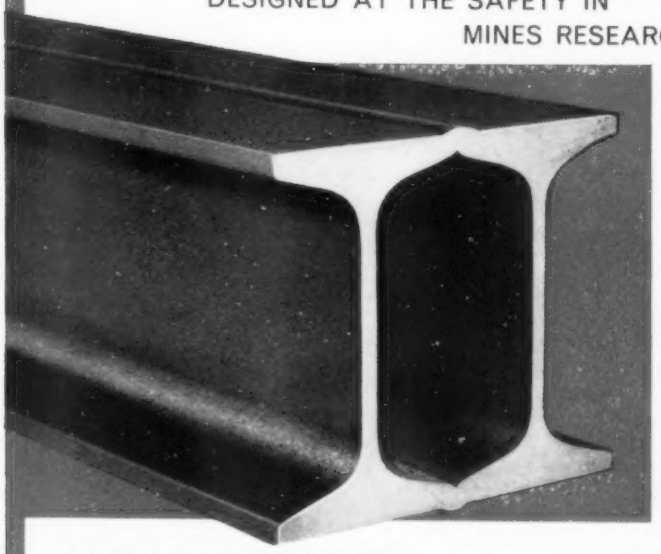

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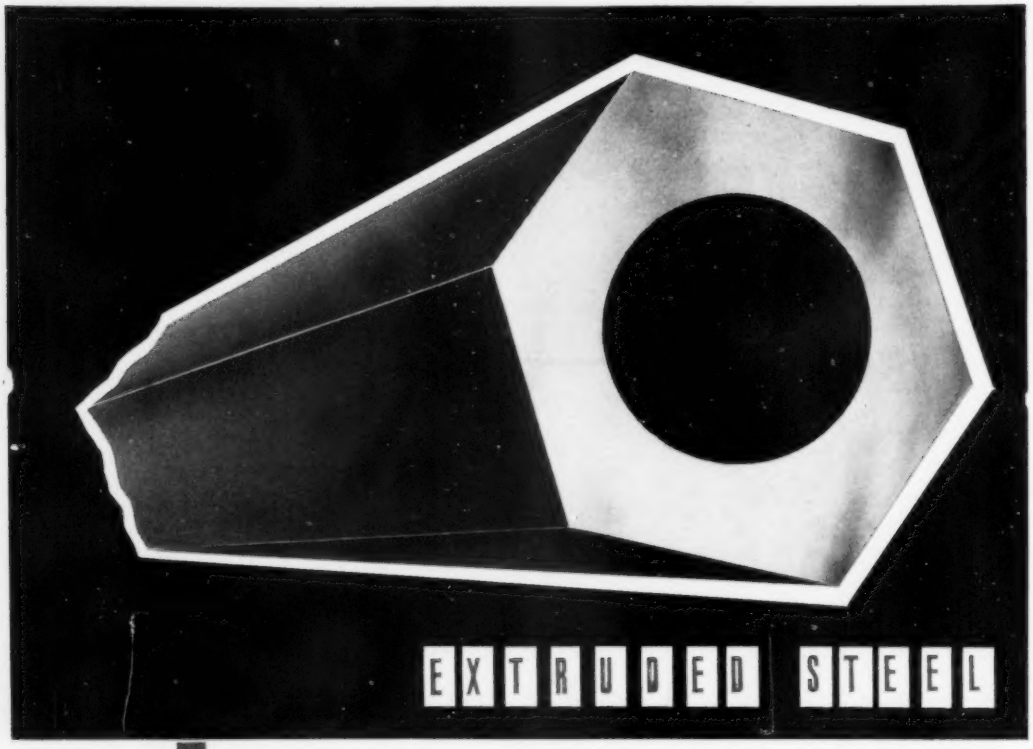

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IRON & COAL
THE IRON AND COAL TRADES' REVIEW

Vol. 182 May 19, 1961 No. 4,844

Charting Britain's Greatest Asset

THE formidable task of taking stock of both the extent and characteristics of Britain's most valuable asset—her national coal resources—has been going on quietly since the 1920s, when the Coal Survey was created for that specific purpose by the Department of Scientific and Industrial Research. On nationalization of the coal industry in 1947, the Survey was taken over by the National Coal Board, which made it an integral part of its scientific department. When it is remembered that there are several hundred geologically distinct coal seams in this country, some of them extending over hundreds of square miles, which are either being worked or are potentially workable, the immensity of the task becomes clearer. Each seam is unique and each is variable. Each has to be examined wherever it is exposed, and samples taken from colliery workings, open-cast sites, and boreholes have to be studied and analysed in laboratories. This information has to be supplemented by data from the Divisional and Area scientific services of the NCB, from the records of the former colliery companies, and from the Geological Survey of Great Britain. To date, the Coal Survey has obtained over 20,000 analyses of coal seams and several thousand additional measurements of seam sections.

Findings of this kind, invaluable in themselves, are of no value unless they are recorded for use in some very lucid manner. The clearest way to present them to those responsible for their use is in the form of maps and diagrams, and it is possible to do this because many of the properties of coal seams exhibit well-defined trends of variation from one part of a coalfield to another. A few years ago it was considered that sufficient data had been amassed to begin to map meaningfully the properties of major coal seams. The first fruits of this accumulation of knowledge are now forthcoming to the extent of printed folios of maps of the characteristics of at least one seam from each of the divisions. Others are in the course of preparation, but it will be some years yet before the 180 seams considered to be of sufficient importance to be treated in this manner have been similarly dealt with.

The Coal Survey is to be congratulated on the way it has got ahead with these unique atlases. Other great coal-producing countries have been quick to follow the British lead, but none of them can yet match the detailed and systematized information contained in the coal survey folios. The properties dealt with are those which determine the value of a seam as a raw material. Firstly, there is the structure and extent of the seam as a workable deposit; secondly, the nature of the pure coal; and thirdly the amount and nature of the impurities within the coal. Structure maps and diagrams portray such features as seam thickness, the extent to which the seam is split into two or more separate beds by bands of rock, and the presence of "washouts" and zones in which the coal is affected by igneous intrusions and heavy faulting. Variations in rank of coals have been charted, and calorific value, moisture-holding capacity, carbon content, hydrogen content, volatile matter, and coking properties have all been charted, as well as ash content and deleterious products containiny sulphur, chlorine, and phosphorus.

Competition on the coal industry's doorstep has called for a whittling down of waste and a clearer knowledge of where it is going. The industry has set itself a target of around 200,000,000 tons a year of all varieties of coal for the next generation. When the folios are completed they will present a comprehensive and clear picture of the major part of our coal resources and provide a sound and indispensable basis for the planning of future production.

GROWTH OF ELECTRICAL EXPORTS FROM UK

EXPORTS of electrical machinery, apparatus, and appliances from the UK are becoming larger, and in the first quarter of this year they rose to £68,300,000 from £60,500,000 last year, an increase of 13 per cent., said Mr. F. J. Erroll, Minister of State, Board of Trade, at the annual luncheon of the Electrical Research Association in London recently. This year the industry had every expectation of breaking through the £300,000,000 mark.

The Minister said that expenditure of the electrical engineering industry on research was far above the average for the whole of manufacturing industry in the country. Research and development in the field of electrical engineering and electronics in 1958 represented 30 per cent. of the total expenditure on research and development by the whole of the manufacturing industry. Electrical engineering employed more than one fifth of all the scientists and engineers in manufacturing industry, and a quarter of all the engineers leaving universities and similar institutions were electrical. This "massive deployment of money and brainpower" was getting results, he said.

BISF Wants Higher Prices for Iron & Steel Products

FOLLOWING a meeting on Tuesday the executive committee of the British Iron and Steel Federation issued a statement concerning the earnings position of the industry. The statement points out that since September, 1960, when coal prices were increased, the industry's costs have risen by some £40,000,000 a year. Even taking earlier cost savings into account the net cost increase over the past year has amounted to some £30,000,000—equivalent to well over 30s. a ton of finished steel.

Steel companies, it is stated, have not been free to adjust their prices in face of such heavy cost increases, as have other private industries and nationalized concerns, since maximum steel prices are fixed by the Government-appointed Iron and Steel Board, which has not yet seen fit to sanction price increases. As a result, earnings in the industry have been under increasing strain for months past.

In this respect, regard must be paid to the fact that steel companies have been planning a record level of development expenditure this year, amounting to well over £200,000,000. The executive committee again expresses its deep concern over the present position and has decided to repeat its request to the Iron and Steel Board to consider authorizing a significant increase in maximum home trade prices for iron and steel products.

The estimate of additional costs includes £12,000,000 for coal and coke and £7,000,000 for increases consequential on higher coal and coke prices, £11,500,000 for wage awards, etc., £1,000,000 for higher road haulage rates, £3,200,000 for increased insurance and pension contributions, and £7,000,000 (estimated) for the Chancellor's proposed hydrocarbon oils duty. The total of £41,700,000 is reduced to £29,300,000 by £12,400,000 reduction in imported ore prices, etc.

A comparison of UK with foreign home trade prices reveals that with the general exception of France, UK prices are lower than those of the US and principal continental steelmakers. French prices are higher for ship plate (open-hearth steel), sheet, and tinplate (per basis box).

A meeting between the BISF and the Iron and Steel Board is likely to be held within the next week or two.

Year Oversea for GEC Apprentice

UNDER the scheme to interchange trainees between firms in the UK and those in Commonwealth countries, one of the activities planned in connection with Commonwealth Technical Training Week, a student apprentice from the General Electric Company, Limited, is to receive a year's experience with the British General Electric Company Pty., Limited, of Australia. In return GEC is receiving a trainee from its Australian company.

The trainee from England is C. N. Ferguson, 22, who has been a student apprentice in mechanical engineering for four years at GEC's Erith works. He will leave in July. The trainee from BGEC, Australia, will be J. R. Rogers, an assistant lighting engineer in the firm's Melbourne branch.

WORK HAS JUST started on a single-storey factory at Linwood (Renfrewshire), for the Pressed Steel Company, Limited. Costing £1,750,000, it is to be completed within 12 months.

Passing Thoughts . . .

ALL the available evidence proves that Britain will need substantial supplies of coal for decades to come. And most of the signs suggest that the real problem of a few years hence is whether there will be sufficient miners to produce it. To talk at such a time of inflicting a fresh wound on the [coal] industry is a piece of unparalleled lunacy. A licence for buying American coal today could be a device for encouraging widespread fuel shortages in British industry as a whole tomorrow.—MR. MICHAEL FOOT, MP, writing in the Daily Herald.

> *Let us have American coal for a limited period: a period when somewhere somebody will realize that, if this can be brought 3,000 miles at a lesser cost than we can supply it from coalfields within a radius of up to even 300 miles, something or somebody wants shaking up.—Letter in the Daily Telegraph.*

Either the coal industry is important enough to be Government-protected until it is sound enough to take care of itself, or it is not. If it is not, it will go on being protected at the expense of consumers who can ill afford to carry the burden. Or it will stagger along, undeveloped, until the economic advantages of rival fuels overwhelm even the best of good intentions.—Yorkshire Post.

> *Logic. Statesmanship. What logic is there in imported coal being a cheaper proposition than the local product? With what statesmanship is the coal industry preparing to meet the conditions now obtaining?—Birmingham Post.*

If the [National Coal] Board were to cut prices to some of the industrial customers that matter most to it (and which can no longer be treated as captive customers) and then balance this by increases to railways and the domestic consumer, upon which the Coal Board still probably lavishes too much cosseting concern, it would at least show willing (though the Government would have to show willing first).—The Economist.

> *The coal miners of South Wales bitterly oppose the import of American coal into this country. . . . The miners are right. The steel industry is shielded by tariffs from foreign competition. The coal industry is not. At the very least, coal mines should be given the same protection as steel.—Daily Express.*

Improved techniques in the [steel] industry's use of coal have brought about economies, and it may be that average consumption of coke in ironmaking will be further reduced. But the measure of the saving cannot offset price rises of the order of 10 per cent. Because of this and other cost increases one may expect the steel industry to ask more for its own products, but whether on balance that would be a good thing for Britain is a nice point.—Tees-side Journal of Commerce.

> *I am against taking over things we don't want. I think that the machine-tool industry is one which needs public ownership. In America and this country the industry is just rubbing along, but in Russia they have processes for the mass production of machine tools.*—MR. RICHARD CROSSMAN, MP.

Britain's balance of payments problems could be solved and purchase and payroll taxes abolished if only industry saved a tenth of the materials it is using in the production of goods.—MR. B. H. DYSON, a former director of Hoover, Limited, speaking to Welsh members of the Institution of Production Engineers.

Rating and Steel

NEW BILL'S PROBABLE EFFECT ON PRICES

WARNING that the new rating and valuation Bill may increase the rate cost in steel from about 8s. a ton to about 14s. a ton is introduced in the British Iron and Steel Federation's quarterly "Steel Review" with the following quotation: "The practice of levying local taxes on the tools and plants of production is, in its nature and essence, economically unsound and even vicious. The rates enter directly into the cost of production and affect our competing power at home and abroad. They vary in weight with every district and with the local politics of every district. They fall with progressive severity upon an industry in proportion as it uses bulky tools."

The remarkably apt quotation is not, the BISF points out, "exaggerated special pleading by industry," but is from the 1928 Budget speech by the then Conservative Chancellor, Sir Winston Churchill, and it marshals concisely industry's four main objections to the new rating proposals:—

They are bad in principle; they will injure our competitive position at home and abroad; they will loosen still further democratic control over wasteful local authority expenditures; and they will intensify the discriminatory burdens already falling on certain industries using heavy process plant.

Bad Form of Taxation

For industry, rating remains basically a bad form of taxation for two reasons, it is claimed. Firstly, because factory buildings are not a reasonable index of ability to pay and, secondly, because, with local authority expenditure concentrated on services for the individual, the present balance between the contributions and benefits of the various classes of ratepayers is unfair to industry.

The steel industry feels that the new Bill will add to costs at a time when competitive power is increasingly vital at home and abroad. In 1958/59 steel paid some £3,000,000 in rates. The reduction of industrial derating from 75 per cent. to 50 per cent. in 1959 increased that burden to £6,300,000. Thus the rates cost per ton of steel has already doubled in recent years. The effects of the new Bill are difficult to estimate, but it would appear that the steel industry which accounted for 0.5 per cent. of the country's total rating valuation in 1958/59 and just under 1 per cent. in 1959/60 may account for about 1¼ per cent.—a little less if domestic properties are fully rated and a little more if they are partially derated.

On the "not improbable guess" that domestic properties may be derated by a quarter on average, the steel industry's share of the total rating valuation may be increased by 1963/64 to one and three quarter times its current level, which is already double that of 1958/59. For an economy which wins 55 per cent. of its total export earnings selling steel and steel-based goods abroad, that, "Steel Review" states, is not a situation to be lightly accepted.

Even with existing checks local authority spending increased by 9 per cent. a year over 1949/59; and "if calling the tune and paying the piper are to be still further divorced, the music may well become wilder." The steel industry is especially concerned because steel companies bear rate burdens out of all proportion to the local expenditures to which their presence directly gives rise; and because they often provide an exceptionally high proportion of the total rate incomes of their localities; more than half in several cases and nearly three quarters in one instance.

A further objection to the proposals concerns heavy industry. Under present rating law certain process plant is assessed for rating purposes. In some industries the proportion of such plant is negligible; in steel, many of the industry's major plant-units—*e.g.*, coke ovens, blast furnaces, steel furnaces, Bessemer converters, and forges—are all rateable. Moreover, at one remove, the steel industry bears the inequitable effects of the present basis of assessment of producers of home-produced iron ore and limestone.

For these reasons the federation has urged that the Bill should be amended in two main particulars—correction of the inequities involved in the present rating of process plant; and generalization of the Minister's proposed power to give derating relief to domestic ratepayers so as to allow any group of ratepayers to qualify for temporary relief in 1963/64 if its share of the national rate burden would otherwise be suddenly and sharply increased.

Sharp Rise in Scottish Valuations

MASS unemployment in the shipbuilding industry if the shipbuilders have to meet the additional burden of the new Scottish valuations was predicted by Sir William Lithgow, chairman of Lithgows, Limited, Glasgow shipbuilders and repairers. Rates on the company's modernized Kingston yard are likely to go up from £1,500 to between £50,000 and £60,000. Sir William, who describes the new valuations as "political, practical, and economic madness," foresees the shelving of several important schemes, including the Greenock graving dock.

The rateable value of the works of William Beardmore & Company, Limited, Glasgow steelmakers, forgemasters, and founders, has gone up to more than £90,000, the valuation of Parkhead Forge having been increased to £68,000 (£17,850). An official of the firm said an appeal would be lodged. The engineering works of Mavor & Coulson, Limited, Glasgow, have been revalued at £19,462 (£5,367) and the Larbert works of the Carron Company, ironfounders and engineers, at £21,416 (£7,106).

Personal

Mr. W. J. W. Bourne, Lancs NACM President

MECHANIZATION engineer of the North-Western Divisional Coal Board since 1955, Mr. W. J. W. Bourne has been elected president of the Lancashire branch of the National Association of Colliery Managers.

MR. W. J. W. BOURNE

A graduate of Leeds University, where he took a B.Sc. in mining engineering, Mr. Bourne received his early training and experience with Airedale Collieries, Limited, which he joined in 1939. Following a period with the Safety in Mines Research Board as a mining engineer, Mr. Bourne was appointed strata control engineer, North-Western Divisional Coal Board, in 1949. Later he became manager of the Standish Hall and John Collieries in the same division. He is a member of the Institution of Mining Engineers and last October he was elected joint secretary of the Manchester Geological and Mining Society.

Deputy-chairman of Powell Duffryn, Limited, Mr. WILLIAM H. SHARLAND, has been re-elected chairman of the Seaborne Traders Association, London, W.C.1.

Mr. GEORGE MONTGOMERY, an electrician at Barony Colliery, Auchinleck (Ayrshire), has been appointed president of the Scottish Colliery, Enginemen, and Boilermen's Association.

Mr. J. N. EDIS, technical director of the Forgrove Machinery Company, Limited, automatic wrapping machinery makers, of Leeds, has joined company service engineers in Moscow to prepare machinery exhibits for the Moscow Trade Fair.

The European Committee for Co-operation of the Machine Tools Industries has appointed Mr. R. W. ASQUITH, chairman of the Asquith Machine Tool Corporation, Limited, as first British president. He will hold this office for two years.

Mr. H. H. MUMBY, a director of Thos. W. Ward, Limited, engineers, coke, iron, steel, metal and machinery manufacturers, of Sheffield, and the Alexander Metal Company, Limited, has been elected president of the British Shipbreakers' Association.

Mr. DEREK WHIPP, until recently a director of Fibalite, Limited, has been appointed regional engineer for central England of the British Lighting Council. For a number of years he specialized in work connected with the design and production of mines lighting equipment.

Mr. STANLEY SHAW, for 14 years welfare and safety officer of George Kent, Limited, industrial instrument and automatic control manufacturers, of Luton (Beds), has retired after 44 years with the company. A presentation from the firm was made by the chairman, Cmndr. P. W. Kent.

Following the relinquishment by Mr. JOHN BLINCH of his appointment as director and secretary of the Purchasing Officers Association, the offices of director and secretary will, from June 1, be held separately. Mr. PETER EMERY, M.P., has been appointed director and Mr. H. HUGHES will be secretary.

Honorary degree of Doctor of Science is to be conferred by London University on LORD NELSON OF STAFFORD, chairman of the English Electric Company, Limited, who is an honorary member of the Council of the Institution of Electrical Engineers and a former president of the Federation of British Industries.

Mr. P. DENHAM CHRISTIE, managing director of the Neptune yard of Swan, Hunter, & Wigham Richardson, Limited, and Mr. R. J. W. RUDKIN, director and general manager of Vickers-Armstrongs (Shipbuilders), Limited, have been re-elected chairman and vice-chairman, respectively, of the Tyne Shipbuilders' Association.

After 46 years in the mining industry, 21 of them in senior management, Mr. I. G. THOMAS, mechanization engineer, No. 5 (Rhymney) Area, South-Western Divisional Coal Board, has retired. Collieries he managed in South Wales include Elliot, New Tredegar, and Groesfaen. At Pontllanfraith last week, tributes were paid to Mr. Thomas and a presentation was made.

Director of the Redheugh Iron & Steel Company, Limited, Dunston-on-Tyne, Mr. DAVID BROWN has been re-elected chairman of the Tyne District Advisory Committee of the Northern Regional Board for Industry. New members of the committee include Mr. F. J. Edwards, managing director, Thermal Syndicate Limited, Wallsend, and Lt.-Cmndr. R. B. Lakin, general manager of Vickers-Armstrongs (Engineers), Limited.

Mr. H. MCNEILL, managing director of Babcock & Wilcox, Limited, has been appointed chairman of the Water-Tube Boilermakers' Association in succession to Mr. J. B. WOODESON, chairman of Clarke, Chapman & Company, Limited, Gateshead, who this month completed four years as the Association chairman. Mr. C. J. HOWARD, managing director of John Thompson Water-Tube Boilers, Limited, has been re-appointed vice-chairman.

Mr. WILLIAM JAMES ASTON, of the continental department of Samuel Osborn & Company, Limited, Sheffield steel and tool manufacturers, was one of the team of nine interpreters which left for Moscow this week to man the British Iron and Steel Federation stand at the British Trade Fair there. Mr. Aston, who has spent his entire career with Samuel Osborn, is a fluent speaker, besides Russian, of French, German, Italian, Spanish, and Dutch.

Director and commercial manager of Robert Frazer & Sons, Limited, iron and steel stockholders, colliery and engineers' stores contractors, etc., of Hebburn (Co. Durham), Mr. T. W. Bowman has celebrated 50 years' service with the company. He is the longest serving member of the staff. Mr. Bowman started as an office boy in 1911, became commercial manager in 1939, and a director in 1944. He has served on many national executive committees of the steel industry and is a past chairman of the local branch of the National Association of Iron and Steel Stockholders.

Member of the council of the Ironfounders Association since its formation 24 years ago, Mr. ARNOLD PEARCE has retired from the executive committee of the association. He has been a member of the Iron and Steel Board since 1958. Mr. Pearce was formerly a director of Birmid Industries, Limited (now AEI-Birlec, Limited), and was, respectively, managing director and chairman of the Midland Motor Cylinder Company, Limited, and Dartmouth Auto Castings, Limited, both Birmid subsidiaries, before he relinquished these appointments on reaching the retiring age in May, 1957.

NEW FUEL POLICY NEEDED

Dr. Georg Tugendhat's Critical Pamphlet

URGENT reappraisal of Britain's fuel and power policy is now called for, not by a stalwart of the National Union of Mineworkers or a member of the Labour Party, but by Dr. Georg Tugendhat, an authority on the economics and technology of fuel and power. He has for many years been associated with the management of oil companies and his pamphlet "The Sources of Energy" is published by the Conservative Political Centre, which emphasizes that it represents the author's views only.

Dr. Tugendhat's conclusions are, not surprisingly, hardly those arrived at by NUM leaders when calling for a new national fuel and power policy. He argues that the technical considerations which 10 years ago forced Britain to base her fuel policy on indigenous coal no longer apply. The social and political objectives served by the special position accorded to coal in the British economy could, he maintains, be achieved more efficiently, simply, and cheaply by other means.

"We, in the UK, have been isolated from the world-wide fall in fuel prices largely owing to the total embargo on the import of coal and the effect of this policy on fuel oil prices. We are probably the only country where the price of coal has not stopped rising. While the price of fuel oil has been steadily falling throughout much of Europe, here it has remained stable," he states.

Competitive Coal Prices

Dr. Tugendhat criticizes the division of responsibility between the Minister and the board of a nationalized industry and their divided objectives split between commercial criteria and non-commercial obligations. He maintains that the Central Electricity Generating Board's decision to switch back from oil to coal "was determined not by economic considerations but by a politically-inspired desire to find uses for surplus coal."

The Coal Board is actuated by a number of motives, but little emphasis seems to be given to making its operations profitable at internationally competitive prices, he says, adding that the competitive position of the coal industry is really very strong.

"Even under today's conditions coal is being produced in the East Midlands at an average of about 60s. per ton, and there is good reason to believe that it should be possible to produce probably up to 120,000,000 tons, if not more, annually by concentrating output on the productive mines. Given the vicinity of these fields to the main industrial areas and the use of the most modern transport methods, coal should be in an almost impregnable position as a supplier of fuels to power stations and steelworks—the natural future outlets for coal."

Conceding that it is just possible that improved production methods would render British coal competitive in export markets, Dr. Tugendhat adds that the coal industry has deprived itself by nationalization of its former world-wide marketing organizations with their personal connections, knowledge of consumer requirements, and commercial acumen.

He believes that if the coal industry is to become economically viable it will need to increase both its labour force and capital. In producing 120,000,000 tons or more per year at highly competitive prices it should be able with increased mechanization to pay even higher wages than at present, but to a smaller number of miners. "Clearly, however, the industry cannot concentrate itself to this size overnight, nor can the country disregard its obligations to the miners," the author adds.

He feels some halfway house between total embargo on coal imports and unlimited free imports of fuel should be found. A substantial tariff on imported fuels, reduced as the domestic industry was concentrated, would provide adequate protection for coal and still give an advantage in lower fuel costs to British industry and especially those sections near coal mines or new ports to which cheap foreign coal could be shipped.

The proceeds from the tariff could be used to finance a scheme for concentrating the coal industry and rehabilitating the miners in "more useful employment." However the money for the operation was raised it would pay the country to devote considerable sums to retraining miners and finding them new jobs rather than keep the price of coal unnaturally high, Dr. Tugendhat maintains.

Finally the author says that the tendency in the past has generally been to overestimate future needs and underestimate resources. Today when technical developments are constantly reducing energy requirements and facilitating the substitution of one fuel by another, if demand for one fuel is underestimated the mistake can probably be rectified by using another. It is impossible, he admits, to put forward clear-cut solutions that will not be controversial; "what can be stated with certainty is that our present energy policy is out of date and requires urgent reappraisal in the light of today's circumstances."

WORK HELD UP ON NEW COKE-OVEN PLANT

TEMPORARY stoppage of work on a new coke oven installation and ancillary equipment valued at £2,700,000 at the Cargo Fleet, Middlesbrough, works of the South Durham Steel & Iron Company, Limited, is understood not to be related to a falling off in steel orders, though the company has declined to comment on the stoppage.

The installation, which will include 60 ovens, coal and coke-handling and by-products manufacturing plant, began last autumn and was originally due for completion by the end of next year.

A Century of Safety Lamps

MANY tributes are being paid this year to E. Thomas & Williams, Limited, makers of miners lamps and mine lighting equipment, of Aberdare (Glam), on the occasion of the company's centenary celebrations. Its contribution, not only to the industrial growth of Aberdare, but also in the much wider field of improving the standard of illumination in the mines was referred to by speakers at the centenary dinner held recently.

Principal of the firm's auditors, Mr. C. Montgomery Wililams, proposing the health of the company, summed up the record and the standing of E. Thomas & Williams when he said: "Men are known by the company they keep and companies are known by the men they keep." Several present at the dinner had been with the firm for over 50 years and a number of others for periods between 25 and 50 years.

Mr. A. W. John, director-general of finance, National Coal Board, referring to the early days of the firm said that when its Cambrian Lampworks started the coal industry in South Wales was small but was growing rapidly. The firm had contributed greatly towards improving the standard of illumination in the mines from those early days and he conveyed the mining industry's thanks to E. Thomas & Williams.

The part played by the Cambrian Lampworks in the export drive was referred to by Mr. S. T. Evans, a director and secretary and general manager, who said the company's products would be found not only in most of the South Wales mines, but in India, South Africa, North and South America, Japan, Russia, and many of the European countries.

The company took over its present premises in 1877 and Mr. Lewis N. Williams, who became sole proprietor on the death of Mr. Evan Thomas, was widely known as an authority on the theory and construction of safety lamps. He became its first chairman and managing director when it was formed into a private limited company in 1907.

COAL "NOT OLD-FASHIONED" SAYS CUC PRESIDENT

SOLID fuel was the right fuel for this country, but there was no room for lethargy in the coal industry, said Mr. J. Stanleigh Turner, president of the Coal Utilisation Council at the annual luncheon of the council's Midland Regional Committee in Birmingham on Monday. It was "extraordinary" the changes and vicissitudes through which the coal industry had passed, and all the things which frightened and alarmed people had happened before. There was no cause for despair if the trade was alive.

Mr. Stanleigh Turner said that many thought that coal was old-fashioned, but the search for modernity in all things was not necessarily right, and coal was not old-fashioned.

FIRST GOTAVERKEN marine crankshaft to be built in this country was recently completed by Walter Somers, Limited, heavy steel forgings manufacturers, of Birmingham, and delivered to the North Eastern Marine Engineering Company, Limited, for installation in a ship being built by Sir James Laing & Sons, Limited, for Nordstron & Thulin, AB, of Sweden. The crankshaft is a six throw and weighs 56 tons.

Appointments

Metals & Alloy Executive Directs Subsidiary

FOLLOWING recent changes in the executive structure of Metals & Alloys (Birmingham), Limited, and its associate company, Metallurgical Refiners, Limited, Mr. P. D. LIDDIARD has been appointed managing director of the two concerns. He joined Metals & Alloys in 1955 as technical general manager and shortly afterwards was appointed to the board. Mr. A. F. BUSHELL, for the past two years sales manager (cast products) now becomes sales manager for the two firms.

Other appointments in the reorganization are:—Mr. F. HOWITT, technical manager; Mr. N. E. EDWARDS, sales office manager; Mr. P. ROBINSON, production manager (powder products); Mr. A. SMITH, production manager (cast products).

Mr. J. E. LOCKLEY has been appointed buyer and material controller of Dudley Drop Forging Company, Limited, Dudley (Worcs).

For the past four years undermanager at Gedling Colliery (Notts), Mr. Maurice S. Beedan, has been appointed deputy manager at the pit. He was previously at Calverton Colliery.

Hilger & Watts, Limited, makers of scientific instruments, of London, N.W.1, has appointed Mr. ALASTAIR CAMPBELL as Scottish representative and Dr. E. R. SAYER as Midlands representative.

Mr. F. M. FIELDHOUSE has been appointed group traffic manager by British Ropes, Limited, Doncaster. He was formerly with the Tarmac, Limited group as transport manager of Tarmac Roadstone, Limited.

Pit Management Changes in North Staffordshire

MANAGEMENT appointments at the Stafford, Foxfield, and Mossfield collieries, North Staffordshire Area of the West Midlands Division of the NCB, are announced. Mr. D. Allcock, for the past four years manager at Foxfield, where earlier he began his mining career, goes to Stafford Colliery. Mr. G. Hopcraft becomes acting manager at Foxfield. He began his career in lead and then tin mining, and his experience in the coal industry has covered collieries in Lancashire, Yorkshire, North Wales, and North Staffordshire. Recently he was undermanager and then for two years acting manager at Berry Hill Colliery.

Mr. R. Thorneycroft, who becomes manager of Mossfield, has been assistant manager of Sneyd Colliery for the past three years. He has been undermanager and then acting manager of Madeley Colliery and after his appointment to Sneyd was seconded as acting manager of Parkhouse Colliery for some months.

In the same Area the following electrical engineering appointments have been made:—Mr. H. Parkinson, previously No. 2 Group electrical engineer, as electrical engineer in the production department at Area HQ; Mr. D. Painter, electrical engineer at Hem Heath Colliery, as No. 2 Group electrical engineer; Mr. W. H. Mountford, electrical engineer, Apedale Colliery, as electrical engineer, Hem Heath; Mr. E. Shone, electrical engineer at the former Berry Hill Colliery, as electrical engineer, Apedale.

Blazing the Trail

"PATHFINDER" MISSIONS ON EUROPEAN MARKETS

"ONE of the most exciting and promising markets in the world—rich, sophisticated, and discriminating." That is how Western Europe is seen by the Export Council for Europe in its first report following the "Pathfinder" missions to Austria, Denmark, France, Italy, Norway, Portugal, Spain, Sweden, and Switzerland. Introducing the report at a Press conference last Friday, Sir William McFadzean, chairman and managing director of British Insulated Callender's Cables, Limited, and chairman of the council, said the purpose of the missions was to lay the trail for the further intensive onslaughts it was hoped that British industry and commerce would make on European markets.

Sir William said that a substantial expansion of exports to Europe could be achieved if existing opportunities were seized and if full regard was paid to the individual requirements of each country. It was now the Council's job to "get it across" to industry, and to this end an international conference, which would be attended by the Prime Minister, would be held at Eastbourne from November 28 to 30.

He emphasized that British salesmen should be fluent in the language in which they were selling—he had met some at Hanover Fair who spoke German fluently, but there were all too few in Europe. Britain must give some thought to the status of its salesman, he believed. They were doing a very important job and were comparable to the technician in status.

Essentials for Success

The report stresses that the missions were fact-finding rather than fault-finding, but does not hesitate to mention matters which are or have been wrong and require rectification. To succeed British firms must be efficient; they must produce the right goods at the right time; sell hard, and provide essential after-sales service. Competitors were active and resourceful, not only in quality, but in meticulous attention to the customers' needs and tastes, standards, currency, and language. The report suggests that too much of British industry has been geared primarily to domestic needs and traditional markets. "A new adjustment is called for, and time is not on our side," it adds.

Paradoxically, traditional British quality is sometimes too high, the report comments. "In some classes of goods and for some markets we could lower our sights and consequently our prices." A problem demanding immediate attention was the obstacle presented by the Channel in easy transport of British exports to Europe.

Dealing with the pattern by industries the missions point out growing industrialization in Spain and Portugal, boom conditions in Italy, and the upward trend of industrial production in Austria. Many problems arising from credit terms must be tackled and consideration ought to be given to manufacture or assembly abroad under licence, etc.

Spain's programme offered scope for the supply of plant and equipment, particularly generating plant for new hydro-electric power stations and diesel-electric locomotives for railways. There was a need also for earth-moving equipment. The Spanish Government expected British firms to be well in the running when large orders were placed by 1963-64. Austria needed plant for steel mills, generating plant, tractors, earth-moving and excavating equipment, though a great deal of work would have to be done before Austrian technicians could be persuaded to look to Britain for supplies instead of turning automatically to Germany.

Britain's share of the machine-tool market could be materially increased, particularly in Italy, Austria, Spain, and Switzerland. The Swiss market for electronics and automation equipment for use in factories and for retail sale was also worth attention by British firms. Britain could also pay more regard to the French engineering market.

So far as coal is concerned, the report feels that Britain should be able to improve upon present exports to Portugal, particularly when requirements for a new steelworks were made known later this year. Portugal's energy requirements, mainly dependent on hydro-electric sources, also need coal in drought seasons and the State railways have been regular buyers of Welsh steam coal for many years.

Export to Norway of all classes of alloy steel could be expanded. Swedish purchases of steel plate from Britain are likely to increase because our delivery dates and prices are now more competitive than Germany's. There should be prospects in Spain for British flat-rolled steel products and for shipbuilding steel purchases. A demand exists in Austria for special steels, tool steels, electrical sheet, steel tubes and forgings, and in Sweden for steel and copper pipes.

Mr. C. E. Wrangham is New Chairman of Short Bros.

NEW chairman of Short Bros. & Harland, Limited, aeronautical engineers, of Belfast, the company in which the Government has a 70 per cent. shareholding, is to be Mr. C. E. Wrangham. He is retiring from the position of deputy chairman of Davy-Ashmore, Limited, and its subsidiaries, and also from the board of Simon-Carves, Limited. Mr. F. C. Unwins, who has been chairman of Short Bros. on a temporary basis, remains a director of the company.

After serving as Director-General in the Ministry of Aircraft Production during the last war, Mr. Wrangham, returned to his former work as a director of C. Tennant, Sons & Company, Limited, merchants in metals and chemicals. He later joined the board of the Power-Gas Corporation, Limited, becoming its chairman last year.

Board Changes

Return of Designer to Crane Firm

MOBILE crane manufacturers, R. H. NEAL & COMPANY, LIMITED, Grantham (Lincs), a member of the Steel & Company, Limited, group, has appointed Mr. Clifford S. Shaw assistant managing director. Mr. Shaw, who designed the original Neal mobile cranes some 30 years ago, returns to the company after 23 years with K & L Steelfounders & Engineers, Limited, 16 of them as technical director.

MR. C. S. SHAW

Mr. Shaw was apprenticed with Ruston & Hornsby, Limited, and became a design draughtsman in the company's excavator department (now Ruston - Bucyrus, Limited). After a period as senior designer and later chief draughtsman with Henry J. Coles, Limited, Derby, he joined R. H. Neal in 1930 as chief engineer. Here he designed the first Neal cranes and pioneered the development of diesel-mechanical cranes. He left to join K & L Steelfounders and Engineers in 1938 where he designed the range of Jones mobile cranes. He is a chartered mechanical and chartered automobile engineer.

KILLICK MARTIN & COMPANY, LIMITED—Mr. C. P. R. Bowlby joins the board on June 1.

NEW HOLLAND MACHINE COMPANY, LIMITED—Mr. Victor R. Despard has been elected to the board.

BIFURCATED & TUBULAR RIVET COMPANY, LIMITED—Mr. R. L. Paterson has been appointed a director.

LYSAGHT'S SCUNTHORPE WORKS, BRANCH OF G.K.N. STEEL COMPANY, LIMITED—Mr. H. C. Challinor, chief engineer at the Normanby Park plant, has been appointed to the board.

THOMAS VALE & SONS, LIMITED—Mr. Ralph Bennett has been appointed a director of the company. He is also chairman and managing director of Smethwick Drop Forgings, Limited.

Safety in Production and Casting of Non-ferrous Metals

REQUIREMENTS for the protection of workers engaged in the melting or founding of non-ferrous metals are proposed in the revised preliminary draft of the Non-ferrous Metals (Melting and Founding) Regulations issued on Tuesday by the Ministry of Labour. These regulations are based on the report of the Joint Standing Committee on Safety, Health and Welfare Conditions in Non-ferrous Foundries.

Copies of the draft Regulations may be obtained from the Ministry of Labour, Safety, Health and Welfare Department (W.5), 19, St. James's Square, London, S.W.1. Any observations on these draft regulations should be made in writing to the Ministry of Labour, 19, St. James's Square, S.W.1, by August 31.

Thoughtlessness Caused Most RTB Accidents

THOUGHTLESSNESS accounted for 302 accidents, or 57½ per cent. of the total of 525 lost time accidents last year at Richard Thomas & Baldwins, Limited, states Mr. J. M. James, manager of the costs and statistics department, in Ingot News, the company's monthly news sheet. He lists four basic faults which result in accidents—thoughtlessness, operational methods, disregard of instructions, etc., and housekeeping.

Operational methods accounted for 101 accidents—19 per cent.—a reduction on the previous year's figures. Disregard of instructions, design and layout, training, maintenance, and protective clothing showed a lower figure, but housekeeping and guarding accidents increased. There was a sharp rise in the number of accidents to female employees—38 compared with 17 the previous year. The average time lost by employees who were injured was 223 hours, an hour more than the 1959 average. The report reveals that in 73 accidents the injuries would have been less severe had suitable protective clothing been worn.

Perhaps the most forceful way of expressing the need to reduce minor injuries, declares Mr. James, is to stress that someone, somewhere in one of the company's works, is being injured every 11 minutes of every day of the year.

Sir Julian Pode Becomes SCOW Deputy Chairman

AT present managing director of the Steel Company of Wales, Limited, Sir Julian Pode has been appointed to the additional office of deputy chairman and is to become chairman when Mr. Harald Peake vacates that office after the next annual meeting on February 5, 1962. Mr. Peake is to succeed Sir Oliver Franks as chairman of Lloyds Bank, Limited, next February.

Other executive changes are announced by SCOW to take effect from February 6, 1962. Mr. W. F. Cartwright, assistant managing director and general manager of the steel division, is to become managing director. Mr. David J. Young, financial director and secretary, will become assistant managing director, and Mr. R. W. Evans, at present director and deputy general manager of the steel division, is to be director and general manager of the steel division. Mr. R. P. Tovey, chief accountant, will be secretary and chief accountant.

ATOMIC MINERAL SHORTAGE

FAILURE to exploit Britain's mineral resources could handicap developments in atomic energy, warned Prof. K. C. Dunham, Professor of Geology in the University of Durham, when he spoke last Friday at Eyam, a small Peak district village, after a meeting of the ancient Great Barmote Court, established in Roman times to deal with lead mining claims.

He was referring to the exploitation of fluorspar, a vital mineral in the atomic programme. Prof. Dunham said there was room for a substantial increase in production. "Unless something is done there could be a very serious shortage of a commodity used for such vital purposes as processing uranium," he added.

ROBENS WARNS PITMEN

Cannot Stand Aside in Inter-Union Dispute

AUTOMATIC recognition would not be given to a new union because it covered 50 per cent. of a section of employees, Mr. Alfred Robens, chairman of the National Coal Board, said on Saturday. He told the annual conference of the British Association of Colliery Management at Blackpool that employees should not be "misled" in their choice of union. He could not stand aside in any inter-union dispute if he felt that it conflicted with employees' interests.

Mr. Robens said he was "most disturbed" to see difficulties emerging between a group of colliery winding enginemen and the National Union of Mineworkers. "Any conflict here will do irreparable harm to the industry without any gains to the men involved, and create intense difficulties for management.

"Trade unions and associations have their responsibilities to particular sections of their membership, but as chairman of the board I have an overall responsibility for the well-being of the whole of the Coal Board in whatever section or at whatever level they happen to be working."

No "Automatic Recognition"

Mr. Robens referred to a recent statement by Mr. Charles Guest, acting secretary of the "rebel" National Union of Winding Enginemen, formed recently by two winding enginemen's associations expelled from affiliated membership of the National Union of Mineworkers after refusing to merge with the union.

He said: "I notice that Mr. Guest is reported recently as having said that to be representative of the enginemen, his new union would require more than half the enginemen in the country as members. I must make it perfectly clear that it does not necessarily follow that, if a new grouping emerges which covers 50 per cent. of a certain section of a class of our employees, it will be automatically recognized by the board as a negotiating body."

Mr. Robens said he considered it his duty to make this point clear so that employees would not be misled into making a decision based on a completely wrong assumption. "The real solution to this problem is a settlement of the differences between the conflicting elements. I am ready to place my services at their disposal in an endeavour to bring about an amicable arrangement."

National president of the association, Mr. Jim Bullock, told the conference that the present time was not a good one to press for big, all-round salary increases if the board were definitely "in the red." Neither was it a good time when mountainous stocks of coal littered the countryside, nor when a tribunal had turned down an application for increases from some other section of the industry.

"It is a good time to press for increases when the industry is on a wave of prosperity and when results are there to prove that the various tasks are being carried out efficiently," Mr. Bullock advised.

MALE VOICE CHOIR TROPHY at Scunthorpe's annual music festival last week was won by Houghton Main.

Mr. J. C. George Dispels Pit Redundancy Fears

MINERS in Yorkshire need not fear that mechanization will cost them their jobs, Mr. John C. George, Parliamentary Secretary to the Ministry of Power, told officials of the North-Eastern Divisional Coal Board last Wednesday, following a visit to Barrow Colliery, near Barnsley. He had been underground to see the latest type of machinery and new production methods in the recently modernized pit.

MR. J. C. GEORGE

It was the only way the industry could ensure its survival, he said. Regarding machinery, Mr. George remarked, "We must have more of it than we have today and we must have it quickly." With NCB officials he was commenting on a report issued by a committee of the Barnsley and District Junior Chamber of Commerce, which said there was a threat of redundancy as a result of the mechanization plan. The report urged the introduction of new industries to cater for the redundant miners. Mr. W. H. Sales, chairman of the division, said the unions had given their full support to the mechanization programme and a joint declaration had been circulated on this issue at colliery level. Men were being recruited into the mines, not being made redundant, declared Mr. John E. Longden, general manager, South Barnsley Area.

While underground, Mr. George saw operations on a mechanized face which works on a 24-hour cycle. He described this system as "the cure to the mining industry's difficulties" and said Barrow Colliery was showing "how to survive and profit."

ASSOCIATION has been formed between Hilger & Watts, Limited, scientific instrument manufacturers, of London, N.W.1, and Wray (Optical Works), Limited, optical instrument makers, of Bromley Hill (Kent). Mr. A. W. Smith, a former president of the Scientific Instrument Manufacturers' Association, is continuing as managing director of Wray (Optical Works).

Law Cases

George Cohen 600 Group Loses Iron Works Appeal

APPEAL by the George Cohen 600 Group, Limited, against a decision of the Minister of Housing and Local Government, that the use they wished to make of Cranley Iron Works, Kettering, would constitute a material change of use requiring planning permission, was dismissed in the Queen's Bench Divisional Court.

The ironworks was formerly used for the reception and preparation of raw materials for producing foundry and basic pig-iron and for smelting and casting the iron. The company had wished to use it for receiving and preparing large quantities of scrap and then selling it to the iron and steel trade.

Lord Parker, the Lord Chief Justice, who sat with Mr. Justice Ashworth and Mr. Justice Lawton, said the sole question was whether the process the company intended to carry out was recovering metal from scrap. In his decision the Minister had stated that without a further stage of smelting the raw material and the casting of the iron and slag, there was not a complete process of recovery of metal from scrap and that, therefore, a material change of use of the land was involved. The Minister had come to a correct decision in point of law and the appeal failed.

The company was granted leave to appeal.

COAL PICKING ON BING

SUGGESTION that some employees at Frances Colliery, Dysart, might be putting good coal on the pit's waste bing was made at Kirkcaldy Sheriff Court when James Davies and James Ramsay were charged with acting together with five other men in stealing 2 tons 6¼ cwt. of coal from the Redd bing at the colliery.

Although the bing was partly fenced and notices were displayed prohibiting coal gathering, Mr. Alfred Lindsay, colliery surface foremen saw, through binoculars, some 10 people on the bing. The coal gathered was put into sacks and loaded on a lorry. Replying to Mr. B. C. T. Wood, solicitor for one of the defendants, Mr. Lindsay stated he thought about 20 tons of coal were dumped on the bing each day.

Ramsay told the sheriff that he had been picking coal from the bing for 40 years. He admitted he knew there was the chance of a police raid. He was found Guilty and fined £8. Davies was found Not Guilty.

BAXTER, FELL & COMPANY, LIMITED, iron, steel, metals and minerals merchants, of London, E.C.3—The whole of the share capital of Aluminium Goods, Limited, Newcastle-upon-Tyne, stockists of quality aluminium, has been acquired. The general policy of the company will remain unchanged. Mr. D. F. Baxter, Mr. D. R. Peacock, and Mr. W. G. J. Wade, of Baxter, Fell & Company, Limited, have joined the board of Aluminium Goods, Mr. Baxter becoming chairman and Mr. Peacock deputy chairman. Mr. W. R. Earle and the present directors are remaining in office. Mr. Geoffrey Hammonds has been appointed managing director.

Yorkshire Seeks 10,000 More Pit Workers

IT is hoped to recruit more than 10,000 men to the Yorkshire coalfield this year, said Mr. M. S. Bates, secretary of the North-Eastern Divisional Coal Board, at a meeting of the East and West Ridings Regional Board for Industry on Tuesday. He added that 4,000 of the recruits might come from school-leavers and this would offset the natural wastage in the coalfield. The first 17 weeks of the year had already provided 1,001 recruits from school-leavers.

Initial judgments were not likely until after the end of the summer term, said Mr. Bates, but there had been encouraging signs over the past eight months, both in the recruitment of boys and of mineworkers who had previously drifted from the industry.

He was speaking at the invitation of the Regional Board which has been concerned about the possible bad effects on NCB recruitment by publicity given to fears of redundancy owing to mechanization and the pressure of competition from oil.

South Wales Miners Seek "Substantial" Pay Rise

RESOLUTION passed by delegates to the annual conference of the South Wales Area of the National Union of Mineworkers at Porthcawl, on Saturday, instructing the executive to press the National Coal Board for a substantial increase in wages, ended: "If it fails to obtain a satisfactory conclusion, the NUM will consider using its industrial power until the wage increase is granted."

Mr. D. D. Evans, general secretary of the South Wales Area of the NUM, said miners wages should be paid on an equitable basis with the rest of the workers in the country. "The job of the miner is as important in recession as it is when there is a great demand for coal."

The conference also called for the nationalization of the oil industry and "its incorporation into a comprehensive national fuel policy to ensure the full and proper development of all industry concerned in coal, oil, gas, electricity, and the development of atomic power."

Model of Samson Electrical Coal Cutter

LATEST in a long succession of mechanical scale models made in the workshops of the Royal Scottish Museum is a quarter size replica of the 15 in. Samson electrical coal cutter. The model, which was put on view for the first time on Tuesday, has taken about three years to build.

The museum has acknowledged the help given by the directors and staff of Mavor & Coulson, Limited, and M. & C. Switchgear, Limited, in supplying detail drawings and advice.

ASSOCIATED BRITISH ENGINEERING, LIMITED—Group results will show no recovery in the year to March 31, 1961, and the board considers that a major reorganization is essential. Due to other commitments the chairman, Mr. O. R. Guard, is unable to give the company the time and attention required and the board proposes the election of Mr. S. R. Hogg as chairman. Mr. Guard is to reassume the position of deputy chairman.

STEEL PLANT MODERNIZATION AND EXPANSION

Schemes Now in Hand

THE summary given here indicates the more important developments of individual iron and steel producers at present in hand in each of the main steelmaking areas. It covers developments approved by the Iron and Steel Board, but not yet completed.

Northamptonshire and Leicestershire

STEWARTS AND LLOYDS, LIMITED (CORBY)

A tonnage oxygen plant—the first to be owned and operated by an iron and steel producer—has been installed and the Bessemer plant modified for oxygen enriched and oxygen/steam blowing. The first stage of an extensive programme of modernization and improvement of the heavy rolling mills, which included the replacement of the cogging mill, was completed in 1959. The second stage should be completed by the end of 1961. Smaller schemes of modernization and development in various parts of the works have been completed. The construction of a new battery of coke ovens and by-product plant is due for completion in 1961 prior to the reconstruction of existing batteries. Schemes of a lesser scale also in progress include improvements to one of the strip mills, modifications and additions to a continuous weld tube mill, and extensions to the tube works' warehouse.

On the ore-mining side, a new ironstone quarry has been opened at Rothwell with an aerial ropeway to carry the ore to the nearest works' railhead. A further stage of the initial development of Thistleton underground ore mine in the Northampton Sand ironstone bed has been completed. At Cowthick the company's second and larger W.1400 walking dragline for the removal of overburden has been commissioned. A third W.1400 walking dragline is under construction to work in a new quarry near Corby.

It is planned to expand iron and steel making capacity at Corby by the installation of a large-diameter blast furnace and a new steel plant. Ingot capacity will be increased by 450,000 tons to 1,550,000 tons a year to allow additional production of billets and narrow and medium width strip. The present intention is that the LDAC process should be adopted for the new steel plant, and a converter unit is being installed for full-scale experimental work.

TUBES, LIMITED

A second "Assel" type tube mill should be completed at the company's Desford works, near Leicester, in 1962. The installation, similar to that completed in 1954, is designed for the manufacture of thick-wall tubes for the ballbearing industry.

Lancashire, Denbighshire, Flintshire, and Cheshire

G.K.N. STEEL COMPANY, LIMITED (BRYMBO STEEL WORKS)

The installation of a cogging mill is due for completion in 1961. The output of billets in alloy and special qualities will be increased to 180,000 tons a year.

LANCASHIRE STEEL MANUFACTURING COMPANY, LIMITED

The company's main post-war development programme at its Irlam Works included coke ovens, two blast furnaces, additional steelmaking plant, and cogging and billet mills. All the plant has now been commissioned with the exception of the third open-hearth furnace, which is expected to be completed in 1961. An ore-drying and sinter plant should be completed in 1962 to give additional pig-iron production and so enable steel output to be raised to 875,000 tons a year.

A continuous rod and bar mill to be installed at Irlam should be completed before the end of 1961 and will bring the company's capacity for wire rod to approximately 500,000 tons a year

EXORS. OF JAMES MILLS, LIMITED

The provision of additional finishing facilities will be completed early in 1961.

MONKS, HALL & COMPANY, LIMITED

Modernization of the company's light section and bar mills at Warrington is scheduled for completion in 1962.

STEWARTS AND LLOYDS, LIMITED

A new works at Shotton to produce electric weld resistance pipe in the range of 6⅝ in. to 16 in. dia. is on the point of completion. Raw material requirements in the form of hot-rolled strip will be drawn from the adjacent works of John Summers & Sons, Limited.

JOHN SUMMERS & SONS, LIMITED

A major expansion programme to raise steel production and sheet processing capacity at Shotton to 1,650,000 ingot tons a year should be finally completed by the middle of 1961, or possibly a little earlier. The greater part of the scheme, including a sinter plant, a 12th open-hearth furnace, the addition of a universal roughing stand, and the modernization of the hot-strip mill, including remotoring, has already been completed. The work outstanding comprises mainly additional soaking pits and cold-finishing equipment.

The company also has in hand a further sinter plant which, when completed in 1961, will increase iron production to 1,200,000 tons a year to support a further increase in steel output to 1,900,000 tons. Also due for completion in 1961 is a 56-in. reversing cold-strip mill. A third slab reheating furnace and a third down-coiler are on order and should be completed during 1962.

G.K.N. STEEL COMPANY, LIMITED (LYSAGHT'S SCUNTHORPE WORKS)

A plan now in hand is designed to take crude steel production up to 935,000 tons a year and includes additional ironstone development, further ore preparation and sinter plant, an LDAC steelmaking plant comprising two 50-ton vessels and a mixer, and modifications to the finishing end of the billet mill.

RICHARD THOMAS & BALDWINS, LIMITED

Modernization and expansion of the Redbourn Works, due to be completed in 1961, includes an additional battery of 62 coke ovens, the relining and enlargement of three blast furnaces, the installation of two Rotor furnaces, and an additional soaking pit. The existing billet mill is being replaced by an eight-stand continuous mill and the cogging mill housings renewed. Crude steel output will be raised to 690,000 tons a year to give 600,000 tons of billets.

UNITED STEEL COMPANIES, LIMITED

Appleby-Frodingham Steel Company branch.—The plate rolling capacity has been increased by the replacement of the slabbing mill and the installation of a new 12-ft. plate mill (consisting of a two-high roughing stand, a four-high finishing stand, and a new finishing line) to replace a 10-ft. mill. Shearing facilities at the 7-ft. plate mill have been replaced by a rotary shearing line. Two new batteries of coke ovens have been commissioned together with a new by-products plant. A plant of a design developed by the company to desulphurize all the coke-oven gas made is nearing completion. A tonnage oxygen plant with a capacity of 100 tons a day has been in operation since January, 1961. Three open-hearth furnaces have been converted to oxygen-blown furnaces of Ajax design evolved by the company for obtaining increased production from existing open-hearth furnaces by the intensive use of oxygen.

The addition of new stands to the heavy section mill for the rolling of universal beams will be completed in the middle of 1961. Further expansion recently put in hand and due for final completion by 1963 (with various stages coming into production at earlier dates) includes additional ore preparation plant, the conversion of a further five steel furnaces to Ajax design, a continuous casting plant for casting 9-in. sq. blooms with a production capacity of 250,000 tons a year, a 28-in. reversing mill, an 18-in. billet mill, and a continuous rod and bar mill with a capacity of 300,000 to 350,000 tons a year. The first of these Ajax conversions came into production in January, 1961. Pig-iron production will be raised to 1,950,000 tons and ingot production to 1,900,000 tons a year.

Development of an underground iron-ore mine at Easton, near Colsterworth, should be completed in 1962, and development of a new quarry at Stoke Rochford by 1964-65. Also on order are a W.1800 dragline for the Roxby quarry and a Marion excavator for Colsterworth. These developments will make a substantial contribution to increased extraction of home ore needed to support the expansion at Appleby-Frodingham.

North-east Coast

CONSETT IRON COMPANY, LIMITED

By the end of 1960 the installation of a four-high 11-ft. plate mill on a new site had been completed in replacement of the company's existing plate mills. Construction of additional steelmaking plant incorporating both the Kaldo and the LD processes is expected to be completed at the end of 1961, raising potential steel output to 1,260,000 tons. A continuous strip and bar mill to be installed at Consett should be completed by the end of 1962.

DORMAN LONG (STEEL), LIMITED

The rebuilding of two batteries of coke ovens at Cleveland and the extension of berthing facilities at the company's South Bank wharf should be completed in 1961. The installation of a third blast furnace at Clay Lane and a sixth 360-ton open-hearth furnace and a third 600-ton active mixer at Lackenby is scheduled for completion in 1962 and will raise ingot-making capacity to 2,600,000 tons a year.

The company now has in hand a further stage of development aimed primarily at improving the efficiency of plate and semi-finished steel production, but involving also some expansion of capacity, particularly in the field of light rolled products. The initial part of the programme, scheduled for completion before the end of 1963, includes a new slabbing/blooming mill, a universal plate mill and a new high capacity wire rod mill at Lackenby, as well as facilities for cold-rolled strip production.

These new developments will enable obsolete plant to be taken out of production. The board has approved in principle the general objectives of further expansion of steelmaking in the Lackenby/Cleveland area to balance productive capacity and of further modernization of rolling facilities in line with developments already approved.

SKINNINGROVE IRON COMPANY, LIMITED

A sinter plant is expected to be completed at the end of 1961.

SOUTH DURHAM STEEL & IRON COMPANY, LIMITED

The company's new South Works at Greatham, West Hartlepool, should be completed during 1961. Production on a limited scale began in August, 1960, and the first plate was rolled in September. The works have been specially designed for the production of heavy steel plate, and include coke ovens, a 28-ft. 3-in. dia. hearth blast furnace, an open-hearth melting shop with six 350-ton tilting furnaces to give an output of 830,000 ingot tons a year, a slabbing mill, and a two-stand four-high 12½-ft. plate mill.

At the Cargo Fleet Works the company is modifying the heavy section mill for the rolling of universal beams and this should be completed early in 1962. The replacement of the existing coke-oven plant is scheduled for completion in 1963.

Scotland

COLVILLES, LIMITED

The company's main project is the strip mill extension to the new Ravenscraig Works at Motherwell, which came into production in 1957. The slabbing and blooming mill due to be completed in 1961 will supply slabs for the company's neighbouring Dalzell Works as well as for the new strip mill. The strip mill project includes coke ovens, sinter plant, two additional blast furnaces, a fourth open-hearth furnace, an LD steel plant, and a semi-continuous hot-strip mill to roll finished strip up to 60 in. wide. Completion of the project, scheduled for the middle of 1962, will raise crude steel output at Ravenscraig to 1,260,000 tons and provide 675,000 tons a year of strip mill products. Associated with the Ravenscraig development is the installation at Gartcosh of a four-stand cold reduction mill and appropriate ancillary equipment for the production of cold reduced sheet from hot strip supplied by the Ravenscraig mill. The new plant will replace the company's hand sheet mills at Gartcosh.

During 1960 the modernization of the rolling facilities at Hallside for the production of alloy steel billets was completed. An 80-ton electric furnace is to be added to this works.

At Lanarkshire Works the modification of the heavy section mill to roll universal beams will be completed early in 1961. At Dalzell the replacement of slab reheating equipment for the heavy plate mill is under way and heat-treatment plant for this mill is also planned.

At Clyde Iron Works the replacement of the sinter plant will be completed in 1961. At Clydebridge the existing plate mill is being replaced by a four-high 10-ft. mill due for completion towards the end of 1962.

Staffordshire and Worcestershire

BROMFORD IRON & STEEL COMPANY, LIMITED (WEST BROMWICH)

The company plans for completion in 1962, the installation of a 20-ton electric arc furnace and a continuous casting machine to produce billets for rolling in existing narrow strip mills. Billet production would be about 40,000 tons a year.

CABLE STREET MILLS, LIMITED (WOLVERHAMPTON)

The company is replacing two hand mills with one of modern design.

JOHN FOLKES (LYE FORGE), LIMITED

A new works is under construction on a greenfield site at Kidderminster, about six miles from the present Stourbridge works. The plant will include a 2,000-ton forging press, and reheating and heat-treatment furnaces which should be in operation by the middle of 1961.

GOLDENDALE IRON COMPANY, LIMITED (NEAR STOKE-ON-TRENT)

Modernization in hand includes a hot-blast cupola, a pig-casting machine, and gas-cleaning plant, and should be completed in 1961.

JOHNSONS IRON & STEEL COMPANY, LIMITED (WEST BROMWICH)

Obsolescent mills are to be replaced by a new combination mill with ancillary equipment for the production of light sections and bars. Completion is scheduled for the middle of 1963.

J. B. & S. LEES, LIMITED (WEST BROMWICH)

The company is extending its plant for the production of special qualities of narrow cold-rolled strip. The first stage is due for completion in 1962.

LONDON WORKS (BARLOWS), LIMITED (OLDBURY)

A new semi-continuous combination mill for the production of light sections and bars and coiled bar is to be installed on a greenfield site in the West Midlands. The production of the new mill, scheduled to come into operation in 1962, will be about 200,000 tons a year. It will replace some of the company's older mills.

ROUND OAK STEEL WORKS, LIMITED (BRIERLEY HILL)

The provision of additional finishing capacity for alloy tube rounds should be completed in 1961.

SHELTON IRON & STEEL, LIMITED (STOKE-ON-TRENT)

A new turbo-blower to replace existing obsolete plant should be completed by the middle of 1962. The company is about to put in hand a major

scheme to replace the existing open-hearth furnaces and rolling mills. A pneumatic steel plant is to be installed. The cogging mill will be replaced by continuous casting. The new finishing mills will enable the company to extend its range of light, medium, and heavy sections and to roll universal beams. On completion, expected by 1963, steelmaking capacity will be increased from 250,000 ingot tons a year to about 350,000 tons.

STEWARTS AND LLOYDS, LIMITED

In 1959 the replacement of the rolling mills at Bilston was completed and the major reconstruction of the melting shop will be completed in 1961. The capacity will have been increased to 550,000 ingot tons a year.

WOLVERHAMPTON & BIRCHLEY ROLLING MILLS, LIMITED

It is proposed to replace by 1963 the existing 12-in. mill at the company's Wolverhampton works by a 14-in. tandem mill.

South Wales and Monmouthshire

G.K.N. STEEL COMPANY, LIMITED (GUEST KEEN IRON & STEEL WORKS

The coke ovens are being rebuilt in stages and should be completed in 1961. The mill bays have been extended to allow easier handling, finishing, and despatch of rolled products.

Development in hand includes a new boiler and turbo-blower, to be completed in 1961. A further scheme for increasing plant efficiency and production is due for completion in 1963. This includes equipment to operate all four blast furnaces simultaneously, extensive use of oxygen in open-hearth furnaces, additional soaking pit capacity, and the installation of a roughing train between the blooming mill and the continuous billet mill. Crude steel production will be raised to 1,000,000 ingot tons.

GUEST KEEN & NETTLEFOLDS (SOUTH WALES), LIMITED

A scheme was completed in 1959 to increase the speed and output of the Tremorfa rod mill. A further scheme is in hand to increase still more the capacity of the rod mill, and should be completed in 1961. The capacity of the mill will then be 350,000 tons a year. A new 16-in. cross-country mill to be completed in 1962 will extend the range of light re-rolled products. Production will be increased by 125,000 tons a year after allowing for the replacement of the 9-in. bar mill output.

STEEL COMPANY OF WALES, LIMITED

A third electrolytic tinning line at Trostre is due for completion in 1961. Ingot production is to be still further increased to 3,650,000 tons a year under the scheme initiated in January, 1960, to provide more cold reduced sheet and tinplate. At Margam and Abbey pig-iron output will be increased by additional sinter capacity and the installation of high top-pressure equipment on two blast furnaces. Melting shop capacity will be increased by converting each existing open-hearth furnace to 400 tons capacity; the slabbing mill will be augmented by a continuous casting plant; and a new temper mill will be installed. Slabs will be processed into hot strip at Richard Thomas & Baldwins' Spencer Works and returned to the Steel Company of Wales for further processing. A continuous annealing line will be installed at Trostre and a pickling line at Velindre. Completion is scheduled for late 1961 or early 1962.

At the end of 1960 developments were put in hand to increase pig-iron production and so reduce dependence on scrap and to improve steelmaking efficiency. More sinter plant will be installed as well as increased blowing equipment. Further open-hearth furnaces at Abbey will be converted to 400-ton units, raising the capacity of that shop to 2,500,000 ingot tons a year, and a fourth bottom-blown converter installed. No increase in steel output is envisaged, but the new capacity will enable the old melting shop at Port Talbot to be closed. Completion is scheduled for 1963.

At Orb Works, Newport, a scheme was completed in 1960 for processing equipment to increase production of electrical sheet. Work was then started on a new project to increase production still further, including two cold reduction mills for wide and narrow strip, and processing plant. Completion is expected in 1962.

RICHARD THOMAS & BALDWINS, LIMITED

Ebbw Vale Works.—A scheme is in progress which includes the installation of a second electrolytic tinning line.

Panteg Works.—The second and major stage of mill development at Panteg includes the installation of a Sendzimir cold reduction mill to roll 48-in. wide stainless strip, an additional softening and descaling line, and a two-high planishing mill. Completion is expected by the middle of 1961. A continuous casting plant, scheduled for completion in 1962, is to be installed for casting stainless steel slabs and for large-scale experimental work on mild steel slabs, both for sheet production.

Spencer Works, Llanwern, near Newport.—The new integrated works in course of construction at Llanwern is expected to start production by early 1962 and to reach full output later in the year. The main units will include a sinter plant (which will also provide sinter for Ebbw Vale), coke ovens, two blast furnaces each of 30-ft. dia. hearth, LD steelmaking plant with three 100-ton vessels, a universal slabbing mill, a fully continuous 68-in. wide hot strip mill, and a four-stand 66-in. cold reduction mill. The initial steelmaking capacity will be 1,400,000 ingot tons, but the works is being laid out to allow for substantial further expansion.

Sheffield

BROWN BAYLEY STEELS, LIMITED

Additional ring rolling plant is due to come into operation in 1961. The billet mill is also being extended and improved, and this will result in a substantial increase in the company's production of alloy billets.

BURYS & COMPANY, LIMITED

A 60-in. Sendzimir cold-sheet mill is being installed for the production of alloy steel sheet and is expected to be completed in 1961.

DANIEL DONCASTER & SONS, LIMITED

A 5-ton hammer is being replaced by a 1,500-ton forging press in 1961.

ENGLISH STEEL CORPORATION, LIMITED

At the River Don Works in Sheffield a new 80-ton electric furnace and the reconstruction of the 7,000-ton forging press should be completed early in 1961. The company has abandoned, at least for the time being, the idea of putting down a new heavy forging press at its new Tinsley Park Works and has decided instead to develop first the rolling mill side of these works. The new works will produce alloy and special carbon steels in billet and bar form and will include a melting shop with, initially, two 100-ton electric furnaces and vacuum degassing equipment, a 42-in. blooming mill, two 32-in. billet mills, an 18-in. roughing bar mill, and 18/14/11-in. finishing bar mills. This project will enable the company to close down certain melting and rolling plant in Sheffield, which is obsolete. The scheme is due for completion in 1963.

THOS. FIRTH & JOHN BROWN, LIMITED

Developments in hand include the replacement of the 4,000-ton press and the replacement of certain obsolete forging units by a 600-ton and an 800-ton press. The replacement of the 4,000-ton press is expected to be completed in 1961 and the 600-ton and 800-ton presses in 1962.

FIRTH-VICKERS STAINLESS STEELS, LIMITED

Developments at the Shepcote Lane works include additional warehousing facilities and additional narrow strip production capacity, due for completion in 1961 and 1962, respectively.

SAMUEL FOX & COMPANY, LIMITED

Development due for completion in 1962 includes improvements to the melting shops and extension of the billet rolling and processing facilities to increase the output of stainless, alloy, and high-carbon quality billets.

HADFIELDS, LIMITED

A new melting shop is contemplated containing a 70-ton electric arc furnace.

JESSOP-SAVILLE, LIMITED

A programme of improvements to the melting shop, forge press shop, and cogging mill is now far advanced and will be completed in 1961.

ARTHUR LEE & SONS, LIMITED

Another Sendzimir cold mill for the production of cold rolled strip is expected to be completed in 1961.

PARK GATE IRON & STEEL COMPANY, LIMITED

As the first step in the development of a new integrated works on a site adjacent to the existing Park Gate Works near Rotherham, the company is to put down a new steelmaking department with Kaldo vessels and an electric furnace; a blooming mill followed by a continuous billet mill; and, on the finishing side, a continuous narrow strip mill. The new works will produce about 365,000 ingot tons a year and at the outset will draw from the existing blast furnaces at Park Gate. It is envisaged that the second stage of development of the new works will include ore-preparation and blast-furnace plant. Meanwhile, iron and steel making at the existing works will continue, and the total ingot production will be of the order of 800,000 tons a year. The steel output of both plants will be rolled on the new cogging and billet mill, thus giving a substantial initial load for this equipment.

SHEPCOTE LANE ROLLING MILLS, LIMITED

The production of wide stainless steel strip is to be increased by the installation of a slab reheating furnace, a Sendzimir cold mill, a coil build-up and side-trimming line together with softening and descaling line.

UNITED STEEL COMPANIES, LIMITED

Steel, Peech & Tozer branch.—The company is replacing the Rotherham and Templeborough open-hearth melting shops by a new shop with six electric arc furnaces. Ingot production will be increased by 200,000 to 1,350,000 tons and the plant will, it is believed, be the world's largest making steel exclusively in electric arc furnaces.

United Coke & Chemical Companies, Limited.—This branch of the United Steel Companies has in hand the provision of additional coke ovens at its Brookhouse and Orgreave plants near Sheffield to provide additional coke required at Appleby-Frodingham.

North-west Coast

BARROW STEEL WORKS, LIMITED

The company—managed by the United Steel Companies, Limited—has pioneered in the development of continuous casting of billets and slabs. A pilot production plant has been in operation for some time. By early 1959 it was felt that the technique had sufficiently advanced to justify the installation of a plant for the production of billets on a commercial scale. A scheme incorporating a 20-ton electric arc furnace and two twin-strand casting machines is in hand and it is hoped that the first machine will be in production in early 1961.

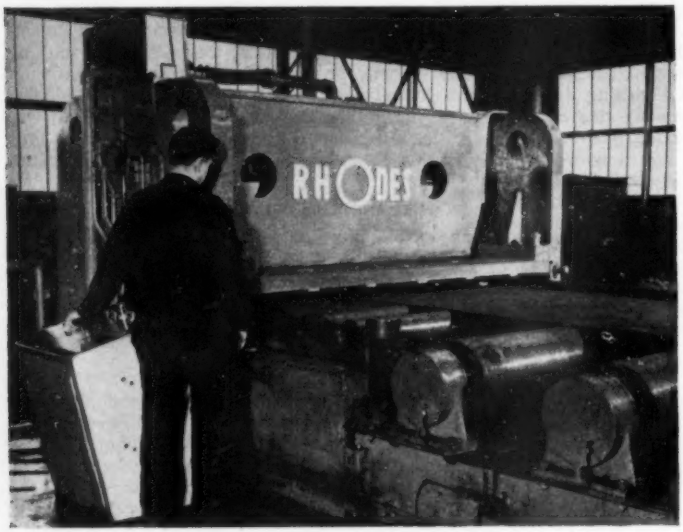
UNITED STEEL COMPANIES, LIMITED

Workington Iron & Steel Company branch.—The replacement of a coke-oven battery is due for completion in 1961. The existing electricity generating plant is being replaced and the electrical distribution system reorganized.

Up-cutting Shears for Stainless Steel

SPECIALLY designed for inclusion at the end of a "cut-to-length" automatic line, a modern up-cutting shears incorporating the company's patented fluid drive principle has been supplied by Joseph Rhodes & Sons, Limited, Wakefield, to the Stocksbridge Works of Samuel Fox & Company, Limited.

The shears is capable of shearing up to a maximum thickness of 1 in. of mild steel or $\frac{1}{4}$ in. of stainless to maximum width of 6 ft. 6 in. The cutting rate of the shears on plate up to $\frac{1}{8}$ in. thick is 20 strokes/min. and on thicker plate six strokes/min.



THE UP-CUTTING SHEARS SEEN IN OPERATION.

In the fluid drive method of actuation, an electro-hydraulic source of power is used to actuate the mechanical action of the shears. The hydraulic power provides an easily regulated and controlled motive force, while the mechanical action ensures high speeds with precision of movement. There are no clutches, rotating shafts, gears, or flywheels; the fluid drive limits the load which can be put upon the machine and eliminates any ill effects due to accidental overload. The relief valve in the hydraulic circuit ensures full safety against overload, as, should any overload occur, the beam would immediately return to its top of stroke position.

Being of the up-cutting type, the shears allows the line conveyor to be maintained at a fixed height, a great advantage over the orthodox down-cutting shears which would necessitate an automatic dipping conveyor on the outgoing side of the line.

Forthcoming Events

MAY 23

Institution of Plant Engineers (South Wales Branch):—Meeting at the South Wales Institute of Engineers, Park Place, Cardiff, at 7.30 p.m. "The Measurement and Analysis of Noise in Factories," by G. Berry, principal scientific officer, mechanisms, metrology and noise control division, National Engineering Laboratory, East Kilbride, Glasgow.

MAY 25

Royal Society of Arts (Commonwealth Section):—Meeting at John Adam Street, Adelphi, London, W.C.2, at 5.15 p.m. Henry Morley Lecture: "Bauxite and its Importance to the Commonwealth," by W. Brining, chairman of Almin, Limited. Admission tickets from the secretary.

MAY 26

Midland Institute of Mining Engineers:—Annual dinner at the Grand Hotel, Sheffield.

MAY 27

Mining Institute of Scotland:—Annual general meeting at the Grosvenor Restaurant, Gordon Street, Glasgow, at 3.30 p.m.

National Association of Colliery Managers

MAY 25

South Staffordshire, Warwickshire, Worcestershire, and Shropshire Branch:—Annual general meeting.

JUNE 6-8

Annual general meeting and conference in Edinburgh.

Zirconium Production in Europe

THE Société Industrielle du Zirconium has been registered at 195, Faubourg Saint-Honoré, Paris. It is a French company with Italian, French, and German interests. The company is to produce zirconium and to study present and future applications of the metal, especially in the atomic and chemical industries. Sales will be carried out directly and also through the participating groups. The importance of zirconium arises from its notable resistance to corrosion, its transparency to slow neutrons, and its interesting alloys in metallurgy make it indepensable in the chemical, nuclear, and electronic industries. It is utilized, for instance, for containers required to resist the most violent attack by acid and basic solutions and fluorides, for crucibles (instead of platinums), for sheaths for elements of nuclear fuel in reactors to prevent corrosion and coolant pollution by fission products.

Only 15 years ago zirconium was considered a rare metal and a laboratory curiosity. Today, thanks to modern extractive techniques and under-vacuum processes, it is a metal of considerable interest.

DEVELOPMENTS IN DRILLING CROSS-MEASURE BOREHOLES

PART 2: *Applying Rotary Percussive Techniques*

by B. G. MORGAN*

The second part of this paper, presented to the North Wales Branch of the National Association of Colliery Managers on December 10, 1960, describes the results obtained using rotary percussive drilling. After several modifications, a satisfactory drilling programme was established, enabling further trials to be carried out. The first part of the paper, discussing the results obtained with a rotary drilling machine and tungsten carbide and diamond tipped bits, was published in last week's issue.

SINCE it was thought that rotary percussive drilling might offer advantages, a German firm, Saltzgitter Maschinen Aktiengesellschaft, G.m.b.H., was approached between 1954 and 1955, but the state of development of its machine was such that it was unsuitable to the requirements. Further efforts were made to obtain a machine, and in July, 1957, a Hausherr DK9/68S rotary percussive drilling machine was obtained. At this time it was the only compressed-air operated machine of its type in Europe.

The original machine (Fig. 7) consists of a 9-h.p. sliding vane rotary motor which drives, through a double-reduction gearbox, a cylinder in which the percussive piston and shank are located. The piston, which is controlled by a valve, acts on an intermediate piston attached to the shank, drilling torque being obtained by the use of cams located on the shank engaging surrounding grooves.

Traversing is powered by a 4-h.p. motor which drives a centrally located spindle which, in turn, engages a bronze feed nut located beneath the drilling motor baseplate. A forward thrust of 6 tons is available with this system.

The machine as supplied was 12 ft. 7 in. long, and weighed approximately 16 cwt. Drill rods were 5 ft. 3 in. long, 68 mm. dia. and weighed 51 lb. each. Drill rod rotation was 25 r.p.m. under load, while the percussive unit could transmit 2,500 blows/min.

The original drill bits as supplied with the machine were of German manufacture. The holes

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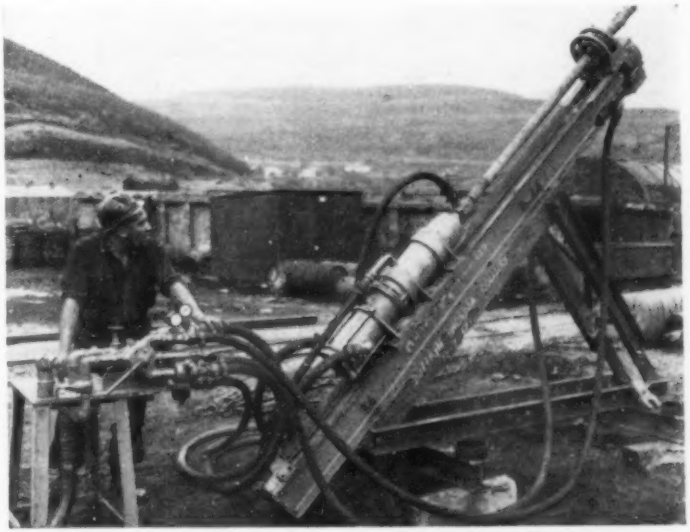


FIG. 7.—THE HAUSHERR DK9/68S ROTARY PERCUSSIVE DRILLING MACHINE.

were initially drilled at 80 mm. dia. using a cross-chisel type of bit. These bits are similar to the ordinary percussive types, but have increased leading and trailing edge angles, the included angle formed being approximately 100 deg. In the design of these bits, one tungsten carbide insert completely crosses the face of the bit. This system is covered by patent, and in the present British-made bits, four separate inserts are used. This practice was adopted to overcome the limitations imposed by the patent and has decided advantages, as is mentioned later. Reaming to casing diameter was accomplished using a two-stage detachable type insert bit, the forward end of which acted as a guide.

Initial Drillings

The initial tests with the machine were disappointing. Four hours were spent in drilling 14 ft. of an 80-mm. dia. hole. Of this time, 2½ hr. were spent in rod uncoupling. On reaming to casing diameter, the three rods were drilled in 1 hr., but a further 2 hr. were spent rod detaching. On examination, it was found that the inserts of the reaming bit were damaged beyond repair, while the guide head had parted from the main body of the bit.

Modifications were made to the rod detaching arrangements and for the next drillings Hausherr's drilling engineer visited the colliery. Over 30 ft. of 80-mm. dia. hole were drilled in 2 hr., only 1 hr. being taken in rod detaching. Reaming of the hole was completed in 2 hr., rod detaching again taking 1 hr. Examination of the bits indicated less wear having taken place than in the previous drillings, but it was felt that the design of the reaming bits could be improved, particularly with regard to tungsten carbide insert support. The hole was completed to 110 ft. in 3 hr. drilling time, a further 5 hr. being spent on rod detaching.

The actual drilling time recorded was most encouraging, but concern was felt regarding the rod detaching arrangements, 7 hr. being spent on this operation. Certain improvements were suggested which were successfully incorporated on later machines.

Further drillings maintained the promise of much higher penetration rates through quartzitic sand-

TABLE 3.—*Comparison of PIV/6 Rotary Drilling Machine and Original DK9/68S Rotary Percussive Drilling Machine Performances.*

PIV/6 rotary machine, 250/550 r.p.m., using 5-ft. 6-in. rods.				DK9/68S rotary percussive machine, 25 r.p.m. and 2,500 blows/min., using 5-ft. 3-in. rods.			
Rod number.	Drilling time.	Rod change time.	Remarks.	Rod number.	Drilling time.	Rod change time.	Remarks.
	Min.	Min.			Min.	Min.	
1	20	5	Diamond coring at 115 mm. dia.	1	5	10	80-mm. dia. tungsten-carbide
2	60	15		2	15	5	
3	90	25		(A) 3	65	20	Bit worn, rods down and up
4	70	25		4	35	7	New 80-mm. dia. bit
5	60	30		5	20	10	
6	105	35		6	20	5	
				7	30	5	
7	30	5	Tungsten carbide, 65-mm. dia.	8	30	45	Rods down
8	17	3					
9	13	2		1	6	24	Rods up
10	50	65	Rods down and up	2	15	5	Reaming to casing dia.
				3	20	5	
11	12	3	Diamond drilling, 66-mm. dia.	(B) 4	15	5	
				5	15	5	
12	30	70	Rods down and up	6	7	5	
				7	9	45	Rods down
13	65	3	Tungsten carbide, 65-mm. dia.				
(C) 14	5	4		9	5	29	Rods up
15	35	60	Rods down and up	10	10	4	80-mm. dia. tungsten carbide
				11	9	5	
16*	5	1	New tungsten carbide, 65-mm. dia.	12	14	5	
17	10	2		13	18	5	
18	4	3		14	15	5	
19	4	4		15	10	6	
20	5	3		16	14	5	
21	5	45	Rods down	17	5	5	
				18	10	5	
				19	12	6	
				20	12	7	
				21	10	5	
				22	10	128	Rods down

	Min.
Drilling time at 115-mm. dia.	405
Rod change time at 115-mm. dia.	135
Drilling time at 65-mm. dia.	290
Rod change time at 65-mm. dia.	273
Total drilling time	695
Total rod changing time	408
	In./min.
Penetration rate, 115-mm. dia.	0.977
Penetration rate, 66-mm. dia.	3.14
Penetration rate, 65-mm. dia.	3.5
Overall penetration rate	2.0
Total operational time as penetration rate	1.25

	Min.
†Drilling time at 115-mm. dia.	307
†Rod change time at 115-mm. dia.	201
Drilling time at 80-mm. dia.	154
Rod change time at 80-mm. dia.	220
Total drilling time	461
Total rod changing time	421
	In./min.
†Penetration rate at 115-mm. dia.	3.1
Penetration rate at 80-mm. dia.	5.7
Overall penetration rate	3.95
Total operational time as penetration rate	2.06

* Average penetration rate at 65-mm. dia., excluding results shown in C, 12.0 in./min. † A + B times used to obtain values shown.

stone and hard strata, but the overall performance was always offset by the times spent on rod detaching. A total of 13 holes was drilled using the machine, the average performance of which is shown compared with the average performance of a PIV/6 machine in the same roadway in Table 3. The results indicate the faster penetration rate through the hard strata, the higher overall penetration rate, and the greater rod detaching times of the rotary percussive machine (even though diamond coring is used with the PIV/6 machine), and also the lower penetration rate of the rotary percussive technique through the shale strata.

During the period, the manufacturers were kept informed of progress and were asked to provide a rotary speed of 150 r.p.m. to permit investigation of pure rotary drilling in shales and drill rod binding, caused, it was thought, by the action of the drill being almost wholly percussive.

Pure rotary drilling through the shales at 25 r.p.m. had been tried, but was particularly unsuccessful. The drilling frame had also been shortened to utilize the 5-ft. 3-in. rod lengths in an attempt to lighten the assembly, which required three men, rather than the usual two-man team for handling.

Early in 1959, a carrier shaft was fitted to replace the planet wheels of the first stage reduction gear to increase the rotary speed to 160 r.p.m. Hausherr's drilling engineer again visited the colliery for the drilling tests with the modified rotational speed.

Prior to these trials, tests of redesigned bits had taken place. These bits, shown in Fig. 8, were designed at the Mining Research Establishment at Isleworth. The 80-mm. type had four 9 per cent. cobalt tungsten carbide inserts, the cutting edges of which are offset. This design gives faster penetration rates through the very hard strata than did the original 11 per cent. cobalt tungsten carbide German bits. A second type, in which the cutters were located in one cutting plane around the shell periphery, had also been tested. These bits had already proved to be superior in performance to the original types and, together with a Widia 80-mm. rotary bit, were used for the trials.

FIG. 8.—REDESIGNED ROTARY PERCUSSIVE DRILLING BITS.

Results from the Modified Rotary-speed Trials

The adoption of the 160 r.p.m. speed proved even more successful than anticipated. Penetration rates through the quartzitic sandstone using rotary percussive technique were increased by approximately 300 per cent., while the penetration rate through the shales using the 160 r.p.m. rotary speed was approximately 150 per cent. faster than when using the rotary percussive method. Rod detaching times were also more comparable to those taken when using rotary machines, indicating that a certain amount of binding must have taken place with the original system utilizing 25 r.p.m. Later drillings confirmed the success of the speed conversion, the results of such drillings being shown in Table 4 which compare the results with the average performance of the original 25 r.p.m. machine. It can be seen that the overall performance of the modified machine is approximately 100 per cent. better than that of the original machine. Rod changing times have been reduced by 40 per cent. while the average penetration rate has increased by over 125 per cent. These performances indicate a minimum saving of two shifts compared with the best rotary machine performance.

TABLE 4.—*Details of the Average Performances of Original and Modified DK9/6SS Rotary Percussive Drilling Machines.*

Operation.	Time taken.	
	At 25 r.p.m.	At 160 r.p.m.
	hr. min.	hr. min.
Drilling 80-mm. pilot hole	3 40	1 0
Rod attaching time	42	32
Rod detaching time	1 5	28
Reaming 115-mm. dia. hole	1 27	53
Rod attaching time	41	32
Rod detaching time	53	24
Drilling 80-mm. hole to final depth	2 34	1 30
Rod attaching time	1 52	1 17
Rod detaching time	2 8	1 28
Overall drilling time	7 41	3 23
Overall rod attaching time	3 15	2 21
Overall rod detaching time	4 6	2 20
Total	15 2	8 4
Average penetration rate 80-mm. pilot hole	2.3 in./min.	8.4 in./min.
Average penetration rate 115-mm. reamed hole	5.1 in./min.	8.4 in./min.
Average penetration rate of above operations	3.7 in./min.	8.4 in./min.
Average penetration rate 80-mm. final hole	5.76 in./min.	9.9 in./min.
Average penetration rate all operations	2.02 in./min.	3.8 in./min.

The best rotary drilling performance at 160 r.p.m. was 14 in./min.

Examination of both types of bit after each drilling indicated no measurable wear as having occurred, and it is estimated that bit footages between 800 and 1,000 can be achieved. This

factor alone represents a considerable financial saving compared to rotary drilling costs.

The most marked difference in drilling technique between the 25 r.p.m. and 160 r.p.m. versions of the machine is the lower feed pressure required with the modified machine.

After the successful second trials, the drilling frame was shortened once more, this time to accommodate 4-ft. rod lengths. This lightened the assembly such that two men could handle the erection and dismantling of the machine and brought the machine into line with the size of the rotary machines. The increased time spent in rod attaching and detaching due to using short rods is partially compensated by the shorter traversing time required to rack back the machine over a distance of 4 ft., as compared with the original 5-ft. 3-in. machine. The standard DK9/68S now utilizes 4-ft. drill rods.

In light of the successful trials a further machine was ordered for Ffaldau Colliery which incorporated the following features:—(*a*) A swivelling rod detaching head to facilitate casing insertion; (*b*) a lighter piston assembly; (*c*) a single-reduction gearbox; (*d*) a thrust-control device; (*e*) special control valves for the rotary motor to eliminate back pressure on the rotor blades.

A comparison of the original and present machines is shown in Fig. 9, which shows the single-reduction gearbox, lighter piston assembly, and split percussive shanks adopted for the present machines, together with details of the present swivelling headpiece which has in use facilitated far easier casing operations.

The new machine was delivered in 1959. A PIV/6 and a DK9/51 rotary machine were in use prior to this time, holes being drilled and coupled to the gas main in an average working time of five and a half to eight shifts. Progress was slower, and bit costs higher than those previously quoted due to three beds of quartz breccia, intrusions of pyrites, and the greater thickness of quartzitic sandstone. The amount of very hard strata at the colliery amounts to approximately 85 per cent. of the depth of the boreholes.

Drilling with the DK9/68S commenced within a fortnight of delivery of the machine, and all operations, including machine erection and dismantling, drilling, and coupling borehole to the gas main were completed in three shifts, the actual operational times being:—Machine erection, half shift; drilling, one and a half shifts; casing, half shift; and machine dismantling, half shift.

This represented a performance at least 135 per cent. better than when using rotary machines. Later drillings confirmed the vastly improved performance of the rotary percussive machine as compared with the rotary machines, holes being completed in two and a half to three shifts as compared with the five and a half to eight shifts normally required when rotary drilling.

Two further DK9/68S machines were then ordered and put into use at the colliery. The initial improved performance has since been confirmed and improved, not only at Ffaldau Colliery but also at other collieries where such machines are in use, each of which is saving an average of two to three drilling shifts.

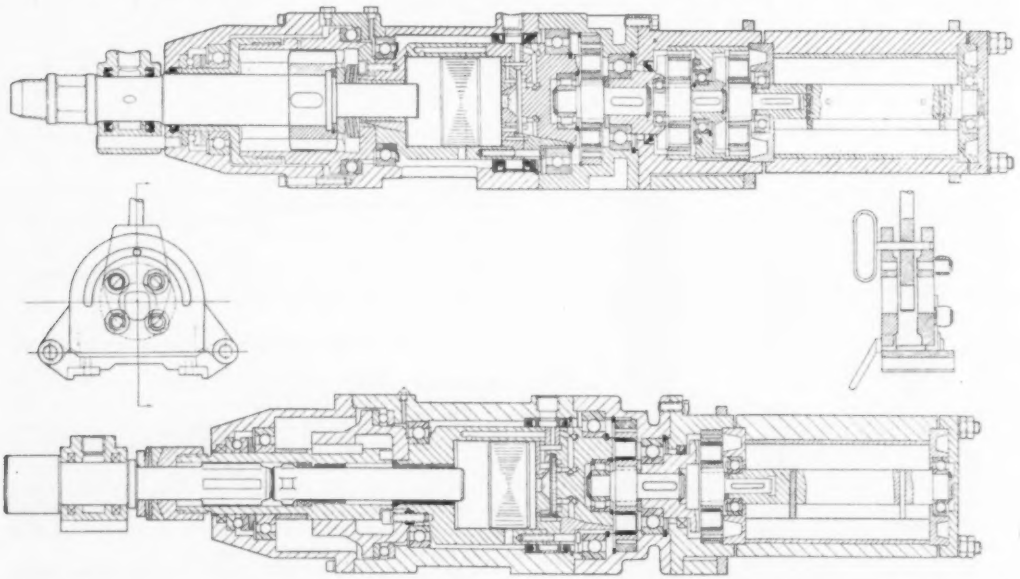


FIG. 9.—SECTIONS SHOWING THE ORIGINAL 25 R.P.M. DK 9/68S ROTARY PERCUSSIVE DRILLING MACHINE (UPPER SKETCH) AND PRESENT 160 R.P.M. DK 9/68S DRILLING MACHINE (LOWER SKETCH). THE TWO SIDE DRAWINGS SHOW VIEWS OF THE PRESENT SWIVELLING HEAD.

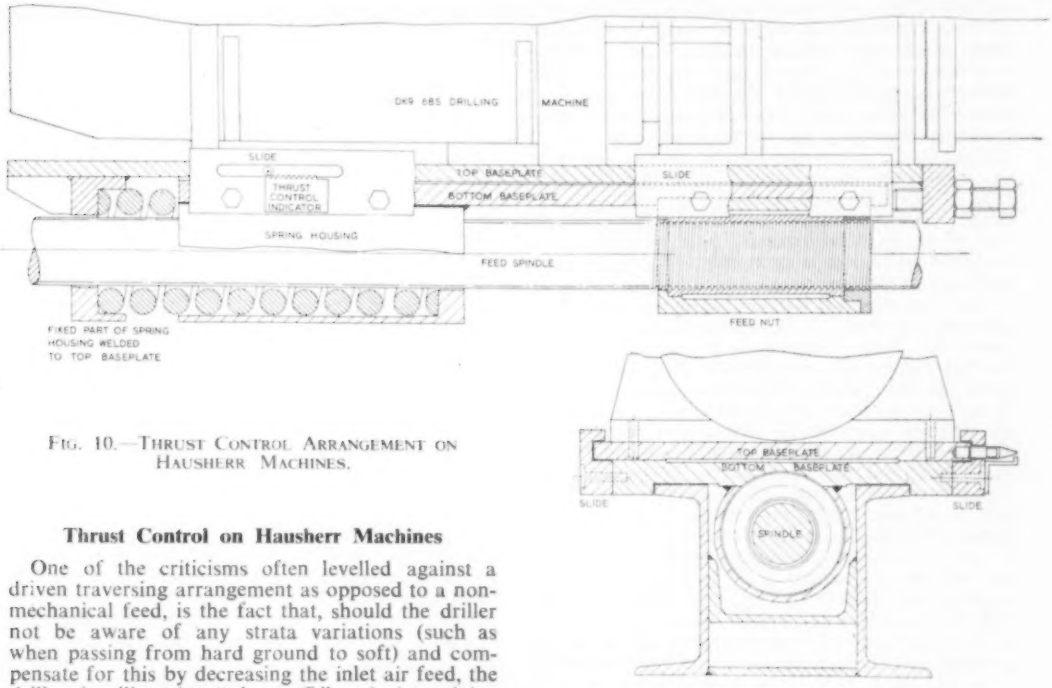


FIG. 10.—THRUST CONTROL ARRANGEMENT ON HAUSHERR MACHINES.

Thrust Control on Hausherr Machines

One of the criticisms often levelled against a driven traversing arrangement as opposed to a non-mechanical feed, is the fact that, should the driller not be aware of any strata variations (such as when passing from hard ground to soft) and compensate for this by decreasing the inlet air feed, the drill rods will tend to " shoot off," or deviate, giving out of line boreholes. This tendency has been overcome on the present machine by utilizing a double baseplate arrangement (Fig. 10).

The motor baseplate is fixed to slides, which are mounted to a sliding baseplate, at the back end of which a bronze feed nut is attached. A calibrated spring, located within a housing, is situated beneath the forward end of the motor baseplate. The spring surrounds the feed spindle, though not in contact with it.

On opening the inlet air valve to the feed motor, the initial forward movement from the spindle is taken up by the sliding baseplate through the bronze feed nut. The forward movement of the sliding baseplate compresses the spring within its housing until the required drilling thrust is achieved, at which time, the motor baseplate transmits the forward thrust to the drill rods, and drilling commences.

The resultant thrust is readily observed at all times from the movement of a pointer, attached to the motor baseplate, across a scale attached to the sliding baseplate. The position of the pointer indicates whether the thrust has to be increased or decreased. In use, the device has proved most successful and has assisted in prolonging the life of the drill bits.

The introduction of the three DK9/68S machines at Ffaldau Colliery had an immediate effect on maintaining the borehole schedule. Boreholes required by the programme were provided and it was decided to carry out work on the limits of drilling, with regard to strata hardness, using the three types of drilling machines available, *viz.*, PIV/6, DK9/51, and DK9/68S.

A borehole was drilled inclined at an angle of 60 deg. from the horizontal to intersect the Five Feet Seam using diamond coring assemblies, the cores obtained being later tested for hardness. This established a basis from which the penetration rates of each machine could be compared in relation to the hardness range of the strata through which drilling took place.

Each machine drilled four boreholes 100 ft. to the Five Feet Seam, all of which were spaced within a distance of 22 yd. and inclined at the same angle along the roadway. After completion, each of the boreholes was sealed off to ensure that no gas would issue into the roadway and that no inter-communication could take place with the active drainage boreholes.

The penetration rates were obtained by the use of a scale, equal in length to the effective drill rod length, which was clamped to the drill motor frame. This scale was graduated in half inches, and every rod length drilled was timed by three officials who recorded the times taken to drill each 3 in.

The results of these tests, are shown graphically in Fig. 11, which indicates that the most marked deterioration in rotary drilling performance occurs between 40 and 55 Shore hardness. This deterioration amounts to approximately 50 to 60 per cent. of the penetration rate range. It is suggested that

strata having a rock hardness of 55 Shore represents the economic limit of rotary drilling using tungsten carbide tipped bits. Rotary tungsten carbide tipped drill bits can be used above this hardness, however, but at prohibitive costs. When considering the conditions which prevail in No. 2 Area in particular and South Wales generally, this limited range of drilling is insufficient to maintain economic drilling practice.

Also the effect of introducing diamond assemblies in strata above 55 Shore hardness is to further reduce the penetration rates of the rotary machines, though at a lesser extent than the reduction up to 55 Shore. Taking into account such factors as bit wear and wages it appears that the economic limit of diamond drilling with the two rotary machines is at 75 Shore, in which strata the maximum penetration rate of the best rotary machine is 2.7 in./min. Obviously, however, uneconomic drilling has to be tolerated with the machines at present in use.

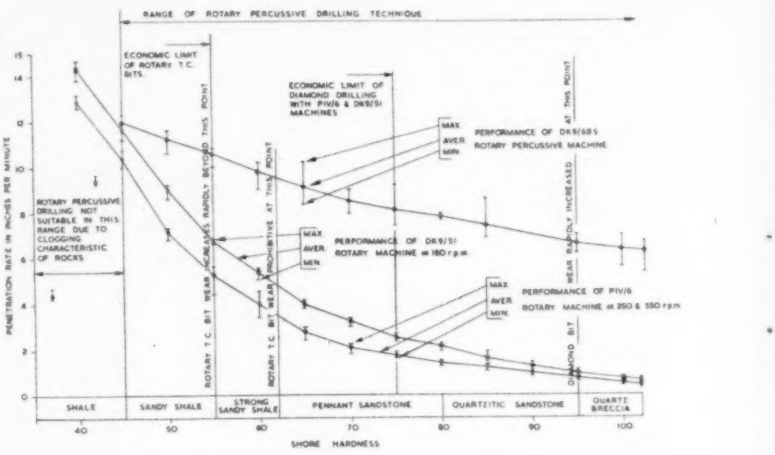

RANGE OF ROTARY PERCUSSIVE DRILLING TECHNIQUE
ECONOMIC LIMIT OF ROTARY T.C. BITS
ECONOMIC LIMIT OF DIAMOND DRILLING WITH PIV/6 & DK9/51 MACHINES
PERFORMANCE OF DK9/68S ROTARY PERCUSSIVE MACHINE
MAX.
AVER.
MIN.
ROTARY PERCUSSIVE DRILLING NOT SUITABLE IN THIS RANGE DUE TO CLOGGING CHARACTERISTIC OF ROCKS
PERFORMANCE OF DK9/51 ROTARY MACHINE at 160 r.p.m.
PERFORMANCE OF PIV/6 ROTARY MACHINE at 250 & 550 r.p.m.
ROTARY T.C. BIT WEAR INCREASES RAPIDLY BEYOND THIS POINT
ROTARY T.C. BIT WEAR PROHIBITIVE AT THIS POINT
DIAMOND BIT WEAR INCREASED RAPIDLY AT THIS POINT
PENETRATION RATE IN INCHES PER MINUTE
SHALE
SANDY SHALE
STRONG SANDY SHALE
PENNANT SANDSTONE
QUARTZITIC SANDSTONE
QUARTZ BRECCIA
SHORE HARDNESS

FIG. 11.—COMPARISON OF MACHINE PERFORMANCES TAKEN FROM RESULTS OF UPWARD DRILLINGS IN ONE ROADWAY.

The vastly improved performance of the rotary percussive machine throughout the hardness range 40 to 102 Shore is so easily observed that no comments are necessary. Below 40 Shore hardness, there is a most marked falling off of rotary percussive technique, due entirely to the clogging characteristic of the shale strata. This disadvantage can be overcome at present by using rotary bits in this range and using the machine as a rotary machine, *i.e.*, with the percussive air feed shut-off. It is mentioned later that trials are in progress with bits having such characteristics that they will perform equally as well as either rotary percussive or rotary bits. If these trials are successful, the rod changes necessary for bit changes in such strata will be obviated.

Although the work was of an empirical nature and cannot compare to the control that can be exercised should such work be carried out under laboratory conditions, the results shown do indicate the probable limits of the two drilling techniques. It is interesting to note that the average penetration rate of 10.6 in./min. shown for the rotary percussive machine at 55 Shore compares almost identically with an average rate of penetration of 10.8 in./min. recorded during laboratory studies of experimental redesigned drilling bits at the Mining Research Establishment, Isleworth (Middx), when drilling through rocks of similar hardness.

The results of the penetration rate trials have been used to assess the probable drilling performance of each type of machine through rocks of various hardnesses in terms of feet per shift. These assessments are given in Table 5 and show the average performances that can be contemplated when the effective drilling shifts are of a 6-hr. duration.

All times shown for machine performances are based on the penetration rates recorded from the previous trials and in the case of the rotary machines, the times per drill rod length have been adjusted to a standard of 4-ft. drill rods.

Up to a maximum of 62 Shore hardness, the rotary machines utilize tungsten carbide tipped drill bits and rod changing times during this phase of drilling are comparable for each of the machines as well as for the rotary percussive machine; the average time taken being 3 min. per rod. In rocks of greater hardnesses than this value the importance of rod changing times becomes apparent due to the combination of the reduced penetration rate of diamond drilling and the increased time spent on rod changing operations necessitated by the adoption of diamond coring.

In all cases in No. 2 Area, when only rotary machines are available, the initial 35 to 40 ft. of borehole to casing height has to be drilled using diamond coring assembles, due to the presence of quartzitic sandstone above the roof of each seam. The actual average time spent in attaching a core barrel and then detaching the assembly and removing the core after drilling is 24.3 min. per 5-ft. 6-in. rod and core barrel length. To allow comparison with 4-ft. rods and core barrels this time is shown in Table 5 adjusted to 21 min.

It can be seen from the table that at a rock hardness of 70 Shore the PIV/6 machine can only be expected to drill the average cased length of a borehole in 6 hr. effective drilling shift, while similar results are met with at 80 Shore with the DK9/51.

At these values, the rotary percussive machine saves a minimum of 1.73 drill shifts and 1.56 shifts

TABLE 5.—*Comparison of Average Performance of Rotary Percussive and Rotary Machines Drilling in Rocks of Various Hardness.*

Shore hardness,	PIV/6 rotary.		DK9/51 rotary.		DK9/68S rotary percussive.		Saving in time per 4-ft. rod DK9/68S.				Results per 6-hr. shift.						Percentage of effective drill shift spent.			
							PIV/6		DK9/51		Distance drilled per 6-hr. shift.			Drilling distance saved per 6-hr. shift by DK9/68S.			Drilling.		Rod changing.	
	Average pen. rate.	Time per rod.	Average pen. rate.	Time per rod.	Average pen. rate.	Time per rod.	In./min.	Min.	In./min.	Min.	PIV/6	DK9/51	DK9/68S	PIV/6	DK9/51	DK9/68S	PIV/6	DK9/51	PIV/6	DK9/51
	In./min.	Min.	In./min.	Min.	In./min.	Min.	In./min.	Min.	In./min.	Min.	Ft.	Ft.	Ft.	Ft.	Ft.	Ft.				
45	10.4	4.61	11.5	4.17	12.0	4.0	1.6	0.61	0.5	0.17	135	149	156	21	7		44.93	36.36	55.07	62.64
50	7.2	6.67	8.9	5.39	11.2	4.3	3.0	2.37	2.3	1.09	94	116	146	52	30		52.12	41.66	47.88	58.34
55	6.2	9.23	6.6	7.28	10.6	4.55	5.4	4.68	4.0	2.73	68	86	138	70	52		55.94	46.78	44.06	53.22
60	4.1	11.7	5.3	9.06	9.8	4.9	5.7	6.8	4.5	4.16	53	69	127	74	58		58.82	50.95	41.18	49.05
65	2.6	17.14	4.0	12.0	9.1	5.3	6.3	11.74	5.1	6.7	35	44	118	80	74		63.74	57.35	36.26	42.65
70	2.1	22.86	3.2	15.0	8.5	5.6	6.4	17.26	5.3	9.4	33	40	110	77	70		69.56	63.74	30.44	36.26
75	1.8	26.67	2.6	18.46	8.1	5.9	6.3	20.77	5.5	12.56	30	36	105	75	69		74.07	69.56	25.93	30.44
80	1.6	30.0	2.1	21.82	7.8	6.2	6.2	23.8	5.6	15.62	28	34	101	73	67		79.5	74.07	20.7	25.93
85	1.3	36.92	1.7	25.24	7.4	6.5	6.1	30.42	5.7	21.74	25	29	96	71	67		80.6	77.85	19.4	22.15
90	1.0	48.0	1.3	36.92	7.0	6.9	6.0	41.1	5.7	30.02	21	25	91	70	66					
95	0.8	60.0	1.0	48.0	6.6	7.3	5.8	52.7	5.6	40.7	18	21	86	68	65					
100	0.6	80.0	0.8	60.0	6.4	7.5	5.8	72.5	5.6	52.5	14	18	83	69	65					
102	0.55	87.27	0.65	73.84	6.3	7.6	5.75	79.67	5.65	67.14	13	15	82	69	67					

compared with the PIV/6 and DK9/51 performances, respectively.

During the penetration rate trials the average time saved by the rotary percussive machine over the rotary machines was 2.5 shifts. The effect of rod-changing times during drilling operations cannot be over-emphasized. The result of this aspect is, of course, easily seen when diamond coring has to be utilized during the drilling of the casing hole. However, it is further affected when drilling in mixed strata rather than such consistently hard strata as at Ffaldau Colliery. Such drillings take place at collieries in the Afan group, and the effect of rod changing necessary when using rotary machines for these boreholes is illustrated in Fig. 12, which compares the best PIV/6 performance with an average performance of the modified original DK9/68S rotary percussive machine. As has been mentionad earlier, the rod detaching arrangements on the rotary percussive machine at this time left much to be desired, and even though the rod change times now achieved with the latest rotary percussive machines (which are comparable with rod-changing times with rotary machines) have not been used to produce the graph, the benefits obtained by using the rotary percussive technique in such strata conditions are easily seen.

Later Trials and Present Work

Following the success of the machine and drill bit trials, attention was now directed to reducing the time spent on "dead" work operations in drilling.

Excluding drilling, "dead" work during firedamp drainage drilling operations may be classified as erecting the machine, rod changing, casing the borehole, and dismantling the machine.

An analysis of borehole operations is shown in Fig. 13. This shows the trend from drilling in:—(*a*) Normal pit strata using tungsten carbide; (*b*) drilling with diamond bits, where necessary at 250 r.p.m. or 550 r.p.m., through strata containing quartzitic sandstone; (*c*) drilling with the DK9/68S at 25 r.p.m., and (*e*) drilling with the DK9/68S at 160 r.p.m.

The benefits obtained for each refinement in PIV/6 drilling technique and for DK9/68S modification are easily seen. But, for each shortened drilling time an increased percentage of overall time is spent on "dead" work operations.

A series of trials was held, some of which are not yet complete, which were aimed at decreasing the "dead" work operations. Four aspects of "dead" work operations were investigated, namely:—(*a*) The development of a more rigid and easily erected drill frame; (*b*) the use of a casing method occupying less time than the normal grouting system; (*c*) the replacement of the 125-mm. dia. reaming operation, by attempting to drill the 125-mm. casing hole in one pass; and (*d*) the development of a bit that will drill equally well as a rotary or as a rotary percussive drill bit.

Examination of Fig. 13 shows that drill frame erection and dismantling time using the standard frame occupies two shifts. The standard frame

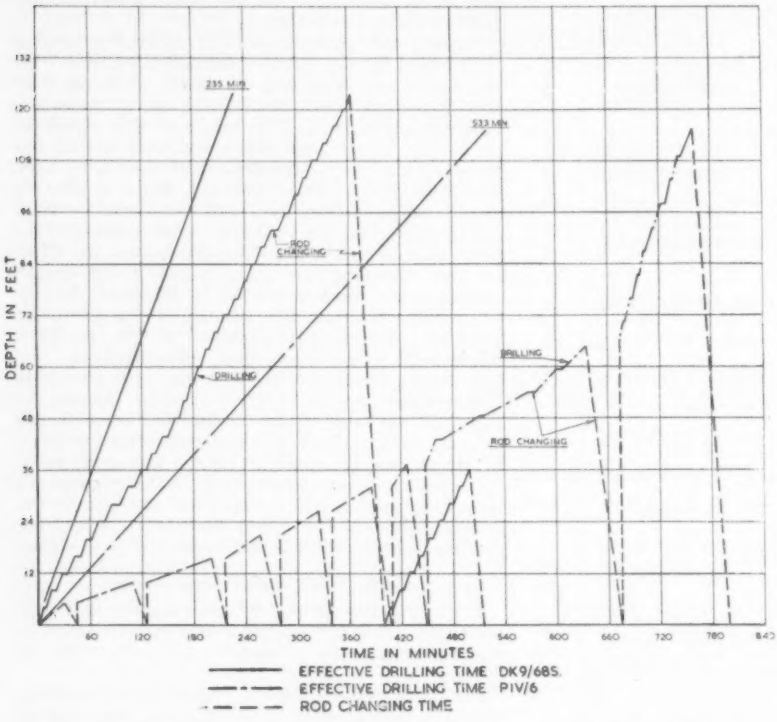


FIG. 12.—COMPARISON OF PIV/6 AND DK 9/68S DRILLING PERFORMANCES.

does not obviate machine vibrations, even when equipped with side struts attached to the roadway arches. A simplified frame consisting of two H-section girders, approximately 13 ft. long, was adopted for the new machine. The two girders are, on setting, locked into the roof of the roadway using Sylvesters. A sole plate is provided at the bottom end of the frame to prevent any sinking of the assembly taking place. Such a frame is erected and dismantled in half the time required for the standard frame, and gives a far more rigid support. This practice has reduced the "dead" work operations by one shift.

The average length of casing used in boreholes is 35 ft. Normally the casing is grouted into the hole using approximately six to seven bags of cement, the operation taking one shift to complete. This method has the disadvantage in that the cement, on hardening, is prone to fissuring and breakage caused by roof movement. Such an occurrence gives rise to a progressive increase of leakage of inbye air into the borehole, thereby affecting the gas purity. A revised form of borehole casing sealing was first introduced in the Area during 1958, which consisted of binding the bases of the third and bottom pipes with felt lagging and wedging the assembly into the borehole. The drilling cuttings from the final drilling operation settle into the annular space between the sides of the casing and the borehole above the top lagging, forming, on drying, a more plastic seal than does cement. This method withstands suction pressures of up to 2.5-in. of Hg, and attempts are now being made to improve this figure. This system reduces the "dead" work by at least half a shift (8.5 per cent.).

The initial practice of providing the casing diameter length of borehole with the rotary percussive machine was to drill to casing height with the 80-mm. dia. bit and then ream out to the 125-mm. dia. Such a practice involves five rod changes, *viz.* (1) Attaching rods for drilling to casing height at 80-mm. dia.; (2) detaching rods to detach the 80-mm. dia. bit and attach the 125-mm. reaming bit; (3) attaching rods for reaming operation; (4) detaching rods to attach the 80-mm. dia. bit for drilling to final depth; and (5) attaching rods to reach the drilling height at upper limit of casing height.

Assuming an average casing depth of 36 ft., nine rod lengths are required. If rod attaching and detaching averages 2½ min./rod (including bit attachment and detachment) such "dead" work occupies approximately 1hr. 52 min. If such a system could be replaced by a method whereby the casing diameter length was drilled in one pass only 1 hr. 7 min. would be taken up in rod changing thus producing a saving of 45 min.

The composite 125-mm. dia. drill bit designed by the Mining Research Establishment for the purpose is basically the standard 80-mm. dia. bit attached to the two stage 125-mm. dia. reaming shell. From the first drilling successful results were obtained. In fact, the saving in rod changing time by the adoption of the system is further improved by the higher penetration rate of the 125-mm. dia. composite bit as compared with the performance of the reaming bit. This improved performance is basically due to the marked decrease in drill rod vibrations observed when reaming was practised.

In total, the adoption of the composite bit for drilling the casing hole saves an average of approxi-

mately 1½ hr., compared with the times previously taken when reaming. These times are made up as follow:—(*a*) Saving in two rod-changing operations, 45 min.; (*b*) replacement of 80-mm. dia. pilot hole operation required when reaming, 50 min.; (*c*) improved drilling performance of composite bit (*i.e.*, rate of 9.4 in./min. for composite bit less rate of 9 in./min. for 125-mm. dia. reaming bit), 2 min.

The slow penetration rate of rotary percussive drilling in shales is also being investigated. When rotary drilling in shales, a maximum penetration rate of 15 in./min. is achieved. On adopting rotary percussive practice, the drilling rate falls to a maximum of 9.5 in./min. Due to the intermittent nature of the quartzitic sandstone in the upper reaches of some boreholes, it is debatable whether it is better to withdraw the drill rods and attach either rotary or rotary percussive bits, as circumstances would require, and accordingly work is proceeding at the Mining Research Establishment to study the requirements of a bit which would give a reasonable performance, both as a rotary and rotary percussive tool. Such a bit would maintain penetration rates through both types of strata and obviate drill rod withdrawals necessary for bit changes in such conditions.

Equipment is being obtained to study the effects of altering the rotation/percussion ratio in varying strata. While the present maximum rotational speed will not be increased, tests will be carried out within a range from the present 160 r.p.m. down to approximately 30 r.p.m. using both lighter and heavier piston assemblies which will be capable of variable rates of percussion ranging from a higher maximum blow rate than the present design. The maximum frequency of blow has yet to be finally agreed with the manufacturers.

It is felt that even further improvements should be forthcoming from these experiments.

From the results of further investigations which have been carried out, additional benefits will be gained if the impact force of the percussive motion on the drill bit cutting edges can be increased. Consequently, bits of a completely new design are being developed in an attempt to increase the depth of drill bit penetration per blow. Several forms will be tried out, but each will have either a centrally located waterway or one waterway per cutting edge. This has been found to be of prime importance in rotary percussive drill bit design.

Comparisons of Drilling Machines and Operational Costs

Initially all drilling machines are purchased complete with sufficient rods to drill 250 ft. Interest and depreciation charges on all drilling equipment amounts to 17½ per cent. If certain operation costs are known and specific assumptions are made, a figure of overall operational costs can be estimated. These assumptions are as follow:—(1) Each machine would drill 20 holes (2,500 ft.) per year; (2) 20 115-mm. dia. and 13 65-mm. tungsten carbide bits would be used (from Table 1); (3) the average overall operational time for rotary machines is six shifts (actual); (4) the average over-

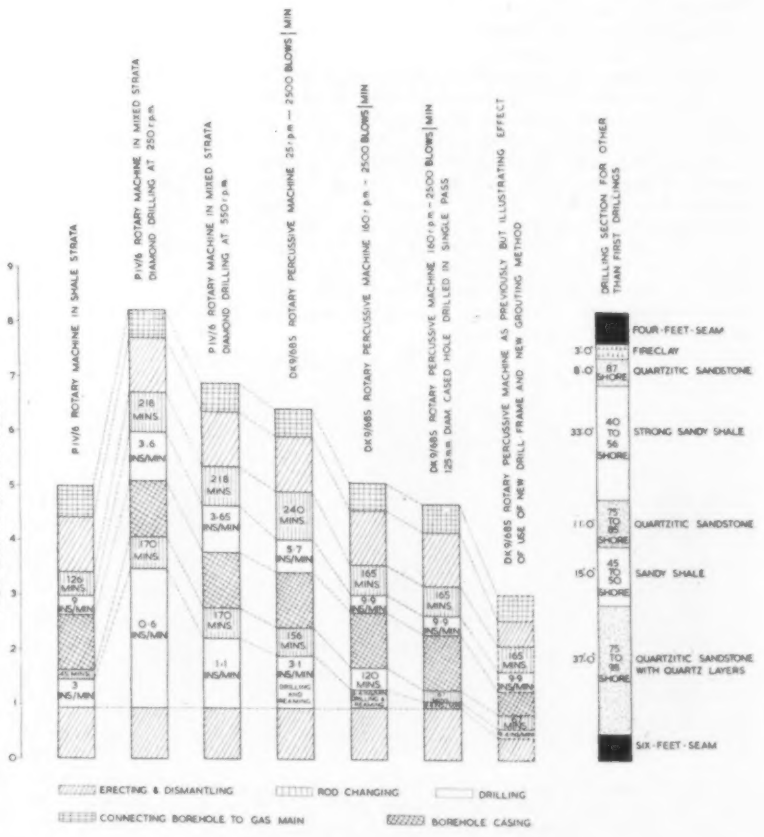


FIG. 13.—ANALYSIS OF DRILLING OPERATIONS.

all operational time for the rotary percussive machine is four shifts; (5) wages costs are £5/shift; (6) average yearly spares costs are known (actual); (7) costs per foot for all bits are shown in Table 1.

TABLE 6.—*Comparison of Drilling Costs of Various Machines.*

Item.	PIV/6 (rotary).	DK9/51 (rotary).	DK9/68S (rotary percussive).
	£ s. d.	£ s. d.	£ s. d.
Cost of machine, rods, etc.	1,366 13 0	1,692 6 0	2,880 0 0
Interest and depreciation of drill at 17½ per cent. ..	239 3 0	296 3 0	504 0 0
Cost of diamond bits, including depreciation ..	315 5 6	315 5 6	—
Cost of tungsten carbide bits	490 0 0	490 0 0	88 10 0
Cost of machine spares ..	130 0 0	93 0 0	90 0 0
Wages cost per annum ..	600 0 0	600 0 0	400 0 0
Total cost per annum ..	1,774 8 6	1,794 8 6	1,082 10 0
	s. d.	s. d.	s. d.
Interest and depreciation cost/ft.	1 11	2 4	4 0
Diamond cost/ft.	} 6 5	6 5	8
Tungsten carbide bit cost/ft.			
Machine spares cost/ft. ..	1 0	9	9
Wages cost/ft.	4 9	4 9	3 2
Total cost/ft.	13 11	14 3	8 7

These values are shown in Table 6 from which it can be seen that the use of the DK9/68S rotary percussive machine in conditions such as prevail in the Area saves a minimum of £692 in annual charges. At Ffaldau Colliery the present saving is approximately £1,200 per annum. Such savings would be increased should the number of holes drilled per year be greater than 20. It can also be seen that the overall cost per foot drilled for the DK9/68S machine is 62 per cent. that of the rotary cost; penetration rates are much higher with the rotary percussive machine and no diamond bits are used.

Since the trials, the savings shown have been further increased and it is estimated that the overall cost per foot drilled can be reduced to approximately 7s./ft.

Conclusions and Recommendations

It has been illustrated that the use of the correct grade of tungsten carbide for both rotary and rotary percussive bits is a prerequisite for successful drilling performance. The rotary bit trials carried out led to the adoption of two grades of tungsten carbide which has resulted in a saving of £4,000 per year. Where rotary percussive machines have replaced rotary machines, a further 2s. 7d./ft. in bit costs alone is saved (*i.e.*, approximately £400 per machine per year). Two tungsten carbide grades are also used for the rotary percussive bits, which in use are capable of drilling over 900 ft. before renewal. The importance of correct bit selection is illustrated in Fig. 14, which compares a bit which had drilled 700 ft. through strata ranging up to 95 Shore and a bit of similar tungsten carbide grade which has been worn out after 6 ft. of drilling in a sandstone of between 75 and 80 Shore. Such an occurrence confirms that the tungsten carbide grade necessary for individual applications is a matter for investigation. Any attempt at standardization to one grade for all drillings, as is the case at present for shothole bits, can only lead to increased drilling costs coupled with longer drilling times, which will adversely affect the firedamp drainage programme.

As with tungsten carbide drill bits, the selection of diamond bits should also be governed by trials. Whereas it is generally found that the smaller diamonds of 16 to 30 stones per carat are more suitable for drilling fine grained rocks than are larger diamonds, experiments in diamond sizes and settings and matrix hardness can lead to much improved performances.

The drill bit trials carried out in the Afan group, and later at Ffaldau Colliery, indicated the narrow range of economic rotary drillings, utilizing tungsten carbide tipped drill bits. The most marked deterioration in performance occurs within the hardness range 40 to 55 Shore, the upper hardness being the economic limit of such drilling practice. Such drilling can continue, although at prohibitive costs, up to a maximum of 62 Shore hardness.

It has been stated that neither the PIV/6 or the DK9/51 rotary machines were designed for diamond drilling, but have had to be adapted for such a purpose in No. 2 Area of the South-Western Divisional Coal Board. Within the hardness range up to 55 Shore the performance of both machines is such that if it is known that the strata to be

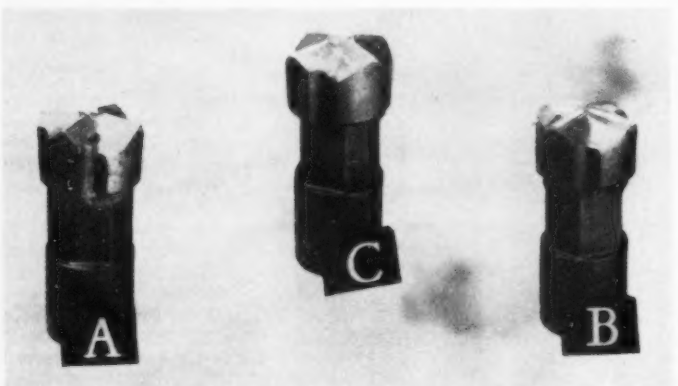


FIG. 14.—COMPARISON OF WEAR WITH TUNGSTEN CARBIDE BITS. "A" SHOWS AN UNUSED BIT, "B" A BIT AFTER DRILLLING 6 FT. IN SANDSTONE WITH A SHORE HARDNESS BETWEEN 75 AND 80, AND "C" A SIMILAR BIT AFTER DRILLING 700 FT. THROUGH STRATA RANGING UP TO 95 SHORE.

drilled in individual applications does not exceed such an upper limit of hardness, either machine, which does not require a large financial outlay in purchase price, offers a good range of economic drilling. Consideration of other types of drilling machines should be governed by availability and requirements, *i.e.*, what is the extent of hard and very hard strata present in the drilling area? The author's preference for drilling such strata, whether of the totally hard or mixed strata variety, is for the rotary percussive technique. This is based upon several factors, three of which are:—the increased penetration rate of rotary percussive drilling as compared with diamond drilling performance, the decreased costs of rotary percussive drilling, and the decreased "dead" work associated with rotary percussive drilling, *e.g.*, no diamond coring and consequent rod changing.

Although rotary machines, correctly designed for diamond drilling, will allow lower bit costs per foot than those shown in Table 6 (*i.e.*, 6s. 5d./ft.), it cannot be envisaged that such machines will drill either at a bit cost per foot comparable to present rotary percussive bit cost (8d./ft.) or at a penetration rate as good as the rates being achieved with rotary percussive machines.

In strata having an average hardness of 65 Shore, approximately 38 to 45 ft. can be drilled per shift with the rotary machines mentioned. It would follow that in cases where such strata exists, the use of machines other than rotary types should be investigated.

At the present time, seven DK9/68S machines are at use in No. 2 Area of the South-Western Divisional Coal Board. Each machine is saving an average of 2 to 3 drilling shifts when compared with the best rotary machine performances. This improved performance so outweighs the increased initial and depreciation costs such that at present a saving of over £7,000 per annum is being made and also an effective drilling programme is being maintained, which has allowed of the introduction of both electricity and 24-hr. cycle operation at certain collieries.

In the past, rotary machines have been almost exclusively used for firedamp drainage drillings. The excessive tungsten carbide bit wear in harder rocks has been tolerated as has the low penetration rates associated with the use of diamond assemblies. The emergence of the rotary percussive technique has opened up a wide field of fast economic drilling, of which due advantage should be taken.

Acknowledgments

The author expresses his thanks to Mr. W. B. Cleaver, Area general manager, No. 2 Area, South-Western Divisional Coal Board, for permission to publish this paper and also for the continued interest he has shown in the work; to Mr. B. G. Fish, of the NCB's Mining Research Establishment at Isleworth, for his assistance and advice and use of certain photographs; Mr. J. G. Bromilow, chief ventilation engineer of the NCB, for his interest and advice; to all the engineers and representatives of the manufacturers mentioned; and to the colliery managers and drilling teams at the collieries concerned, all of whom have assisted in making this paper possible.

The author also thanks Nüsse & Gräfer, Norstel, Limited, English Drilling Equipment Company, Limited, L. M. van Moppes & Company, Limited, Wickman, Limited, Rudolph Hausherr & Sohne, and Dollery & Palmer, Limited, for the use of various figures.

Any views expressed are his own and not necessarily those of the National Coal Board.

Becorit Prop-setting Tool

IN setting the Becorit prop chock there is the problem of raising the heavy head before attaching the setting claw. This is a heavy job, normally requiring one man to lift the head while another man attaches the setting claw on the inner member. Now Mr. K. Jones, unit roof control officer, at Bargoed Colliery, in the National Coal Board's South-Western Division, has invented a lifting device which makes the job lighter and able to be done by one man.

The Becorit prop-setting tool makes use of a lever with fulcrum of adjustable height. The lever is made of a 3-ft. length of 1-in. bore pipe with lifting fork at one end. This fits over the inner member directly below the prop head, and raises the head to the roof when the lever is depressed. The fulcrum is provided by an extension head, the height of which can be varied to suit local requirements. This is done by telescoping a 1-in. bore pipe inside a 1½-in. bore pipe, and providing a series of holes with peg for length adjustment. The 1½-in. pipe is provided with a 5-in. dia. base for stability.

Further stability for the fulcrum column is provided by a simple attachment to the mushroom base of the prop and a spacing piece of ¾-in. pipe. This enables the fulcrum column to be held completely stable while the device is being operated.

When required, the device is set up and the lever depressed to raise the head of the prop to the roof. The lever is then fixed in that position by hitching a chain from the lever to a hook on the fulcrum column. This chain is permanently attached to the lever. With the prop head thus securely held to the roof, the operator is free to attach the setting claw, complete the setting of the prop and finally detach the device ready for use on the next prop.

ECSC PIG-IRON OUTPUT in March was 4,902,000 metric tons, bringing the total production for the first quarter to 13,576,000 tons, compared with 13,400,000 tons in the same period last year.

ECSC STEEL PRICES AFTER REVALUATION

GERMAN and Dutch currency revaluations have affected European Coal and Steel Community steel prices by raising those two countries' prices in relation to French prices (which are the lowest in the Community). The weighted average of German prices has risen from 9.5 per cent. to 15 per cent. above the French, and that of Dutch prices from 11 per cent. to 17 per cent. more. High Authority experts consider that the effects of this are unlikely to be greater than those of the French devaluation, in view of current full order-books and capacity working, which should minimize any consequential market fluctuations.

The table below has been prepared by the British Iron and Steel Federation from figures published in Handelsblatt and Industriekurier, Düsseldorf.

Comparison of Basic-Bessemer and Open-hearth Steel Prices in $ per 1,000 kg. following Revaluation of DM and Guilder.

	Fed. Republic.		Saar.		France.		Belgium.		Luxembourg	Holland.		Italy
	BB	OH	BB	OH	BB	OH	BB	OH	BB	BB	OH	OH
Semis	85.56	95.52	73.68	89.28	69.25	80.05	86.0	100.0	82.00	—	—	94.4
Reinforcing rounds	101.28	—	102.48	—	89.30	—	99/101	—	100.00	106.85	—	108.8/112
Bars	104.16	114.48	102.48	113.28	89.30	99.20	102/104	112/119	112.94	124.02	—	110.4/115.2
Sections	101.76	112.08	100.08	108.48	90.04	100.50	99/107	109/122	—	—	—	110.4/113.6
Broad-flanged beams	110.16	120.24	111.60	—	98.35	108.15	112.0	127.0	—	..	—	—
Sheet piling	123.84	—	—	—	109.70	—	—	—	—	—	—	—
Wire rods	106.08	116.40	103.68	113.28	93.35	100.00	110.0	125.0	103.00	117.96	121.91	121.6
Strip	118.56	130.56	110.88	120.48	96.65	108.70	109.0	131 0	—	120.59	130.61	118.4/121.6
Hot-rolled wide strip	117.60	129.60	115.20	124.80	107.10	114.65	113.127	—	—	—	131.94	—
Universals	111.12	123.60	110.40	124.80	102.20	112.50	108/122	118/138	—	—	—	131.2
Heavy plates	111.84	125.76	111.12	125.52	102.70	114.80	108/122	118/138	—	113.47	121.39	140.8
Medium plates	117.36	130.56	116.64	131.04	104.85	115.10	110/122	120/138	—	113.47	121.39	140.8
Hot-rolled sheets	139.20	151.20	139.20	151.20	119.15	132.00	136-148		138.60	138.87	149.62	153.6/168
Cold-rolled sheets	—	—	154.56	154.56	135.20	135.20	150.30		150.30	—	—	—
1-mm. sheets	161.52	173.52	145.56		135.2		150.30		—	154.84	171.83	172.8

Export of Australian Iron Ore

PROCEDURE in applying for permission to ship Australian iron ore has been announced by the Department of National Development, Canberra. Certain information is required before application to export iron ore can be considered. Details are required of mining title, location of deposit, geological data, sampling results, logs of drill holes, mining programme, intentions about processing in Australia, and exploration plant to prove additional ore.

The Minister for National Development has stated that export of iron ore is prohibited from certain defined areas in the Middleback Ranges, South Australia; the Koolyanobbing-Dowd's Hill-Bungalbin regions, Western Australia, and from Cockatoo, Koolan, and Irvine Islands, Yampi Sound, Western Australia. Iron-ore reserves in these regions are:—Middleback Ranges-Iron Monarch area, 165,000,000 tons carrying 60 to 64 per cent. iron; Yampi Sound, 41,100,000 tons of 47 to 54 per cent. grade; Koolyanobbing-Dowd's Hill-Bungalbin, 69,000,000 tons of 62 per cent. ore. These demonstrated reserves are those that have been extensively tested and found to be usable under present Australian conditions. The total ore reserves contained in the deposits are 368,300,000 tons.

Plastics-coated Pipeline

A PLASTICS-COATED steel pipeline has been put down to carry 126,000 gal. of petrol a day through a corrosive—in some places water-soaked—tract of land in the eastern United States.

Over 42,000 ft. of the special pipe, Republic Steel Corporation's X-Tru-Coat, was installed between the United Refining Company's tank farm and refinery in Pennsylvania. The line replaces a former bare pipeline that had to be relocated because of a flood control project. Unlike the bare line, the plastics-coated pipe is not subject to electrolysis, nor can it be affected by the other corrosive conditions along the installation route.

The pipe was installed in less than four weeks by an eight-man crew equipped with a side-boom tractor and a back hoe. The 4-in. pipe is buried 3 ft. below the surface, or just below the frost line.

The pipe is despatched with either end of the coating cut back about 4 in. to allow welding of the bare steel to the exposed end of the next length. After welding, the exposed joints were wrapped with a pressure-sensitive plastics tape to keep out moisture.

The coating is of high-density polyethylene and is extruded directly over the steel pipe. A special adhesive compound is used to bond the coating and the pipe, preventing underfilm migration. Unlike other pipe coatings, Republic Steel claims, the plastics skin does not become brittle and crack in winter or become soft and sticky in the summer.

The polyethylene cover is completely immune to corrosive action of any soil condition.

Vickers Medical Engineering Products

Examples from the wide range of Vickers medical equipment are being shown at this week's International Hospital Equipment Exhibition at Olympia, London. In the Vickers group research establishment, doctors, scientists trained in the physical sciences, and engineers co-operate on problems associated with medical engineering. They also collaborate closely with the universities, teaching hospitals, and other medical research units.

New Literature

HOUSE magazines, catalogues, booklets, and other publications received include those referred to below. Readers wishing to obtain a copy of any of the items should write to the address given, at the same time mentioning this journal.

NORDBERG MFG. COMPANY, Milwaukee, Wisconsin—"Nordberg Machinery for the World's Major Industries" is the title of a new brochure which illustrates and describes the wide variety of Nordberg products.

GEORGE KENT, LIMITED, Luton (Beds)—Mark 3 "Multelec" electronic temperature and millivolt instruments are described in publication 295, while publication 2511 is a spare-parts list for these instruments.

POLLARD BEARINGS, LIMITED, P.O. Box 9, Knottingley (Yorks)—The second issue (April) of Pollard Bearing News, a four-page tabloid size newspaper, is packed with interesting items about the company and its associates.

BRADLEY & FOSTER, LIMITED, Darlaston Iron Works, Darlaston (Staffs)—"Annealing of Blackheart Malleable Iron" and "Strickle Moulding with Particular Reference to the Use of Loam" are the main features of the spring issue of Bradley's Magazine.

GOODYEAR TYRE & RUBBER COMPANY (GT. BRITAIN), LIMITED, Wolverhampton—"Vee-belts on Graveyard Drive at Sheffield Steelworks," an article in the May issue of Goodyear Industrial Products News, is concerned with the works of Hall & Pickles, Limited.

MARTONAIR, LIMITED, Parkshot, Richmond (Surrey)—Included in the latest issue (Vol. 4, No. 28) of the Journal of Applied Pneumatics (1s. 6d.) are articles on "Furnace Loading," "A New Work Platform for Machine Tools," and "A Low-cost Automation Machine."

INSTITUTION OF WORKS MANAGERS, 196, Shaftesbury Avenue, London, W.C.2—Naturally enough, the subject of accident prevention crops up quite frequently in the columns of Works Management (2s. 6d.), in the May issue of which an insurance surveyor puts forward his point of view.

LINCOLN ELECTRIC COMPANY, LIMITED, Welwyn Garden City (Herts)—Chief among the contents of the spring issue of the Stabilizer is a further instalment of the series of articles on "Tubular Fabrication." The author is A. Scott, the company's works manager. The magazine is "free to all welders who take pride in their jobs."

BRITISH COAL UTILIZATION RESEARCH ASSOCIATION, Randalls Road, Leatherhead (Surrey)—The ninth Coal Science Lecture, "Methane from Coal," delivered by Dr. F. J. Dent last October, is reproduced in full in the BCURA Gazette No. 42 (2s. 6d.). Dr. Dent is director of the Gas Council's Midland Research Station at Solihull.

W. C. HOLMES & COMPANY, LIMITED, P.O. Box No. B7, Turnbridge, Huddersfield—Two new brochures, No. 86 dealing with "Industrion" electrical air filters and No. 88 with products of the Holmes organization, have been issued. Both are well produced. No. 88 is particularly useful as a guide to the activities of the company's various divisions.

INTERNATIONAL NICKEL COMPANY (MOND), LIMITED, Thames House, Millbank, London, S.W.1—Abstracts of papers presented at the 47th annual technical proceedings of the American Electroplaters' Society, which reflect, in particular, work on methods of improving the corrosion-resistance of nickel-chromium electrodeposited coatings, form an interesting feature of the March issue of the Nickel Bulletin, published early this month.

PARKINSON COWAN INDUSTRIAL PRODUCTS, Dolphin Works, Fitzalan Street, London, S.E.11—The entire range of Parkinson-Schwank gas radiant heaters for commercial and industrial heating is described in a new leaflet (S/52). As well as providing the most important technical details of wall-mounting, pipe suspension, angle and horizontally mounted heaters, the leaflet contains a useful section on heater controls and ignition.

INTERNATIONAL COMBUSTION PRODUCTS, LIMITED, 19, Woburn Place, London, W.C.1—Publication G 6010 is an eight-page brochure on Hardinge thickeners. The process of sedimentation is universally used for removing suspended solids from a liquid. Gravitational settlement of solid particles is most effectively carried out in Hardinge thickeners, which, it is claimed, meet the most stringent requirements for the recovery of clarified liquid and dewatered solids.

CAMBRIDGE INSTRUMENT COMPANY, LIMITED, 13, Grosvenor Place, London, S.W.1—Three new publications are to hand from this company. List 25/1 describes the company's range of vapour pressure thermometers, list 148/2 describes the well-known physical type dissolved oxygen analysing meter, while list 143/1 is concerned with recording counters which record the frequency, clock time, and duration of industrial processes or machine operations.

RUSTON-BUCYRUS, LIMITED, Lincoln—The Digger is the title of the quarterly magazine "by, for, and about the employees" of the company. The spring number maintains the high standard of production of previous issues. The judicious use of colour printing does much to enhance the appearance of the contributions. In addition to a number of very readable articles dealing with the firm's products, there are several pages devoted to news of social activities.

AIR PUMPS, LIMITED, Bushey Road, Raynes Park, London, S.W.20—A 24-page illustrated booklet detailing the range of the company's oil-cooled mobile rotary compressors is now available (ref. AR460-1). It shows the 250-c.f.m., 365-c.f.m., and 600-c.f.m. models in operation on various sites. Also available is a pamphlet describing the range of the Mark III, air-flow cooled two-stage electrically driven stationary reciprocating air compressors for pressures up to 150 p.s.i.g.

SIMON ENGINEERING, LIMITED, Cheadle Heath, Stockport (Ches)—Half of the April number of Simon Engineering Review is devoted to a survey of current activities of the many companies in the group. Orders received and progress reports on the work on earlier contracts are detailed and many photographs are used to illustrate the matter. The remaining 30 pages are very largely given to news of appointments, retirements, and the usual run of personal items which help to make a good house magazine.

G. E. SIMM (ENGINEERING), LIMITED, 27, Broomgrove Road, Sheffield 10—The "Tespa" clamping system in stainless steel for making pressure clamps of any diameter is the subject of a new brochure. The

clamp may be used for many purposes, including colliery arch stilting, and examples of the various uses are given, together with clear instructions on applying the system. Also available is a leaflet giving details of the Simm hose-fitting inserters for all types of hydraulic and industrial hose.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.1—From the beginning of last year the company has been trading as a single entity, and for the first time it has become possible to review the work and progress of its engineering divisions and trading companies. This is done in "AEI Review of Work and Progress in 1960," a 60-page brochure. The survey is made under four main headings—generation and supply, industry and commerce, transport, and science and medicine.

ENGELHARD INDUSTRIES, INC., Technical Service Department, 75, Austin Street, Newark 2, New Jersey—Precious metals research in six fields by the company's scientists is summarized in the March issue of Engelhard Industries Technical Bulletin. The six research areas covered are:—Catalysis; purification of gases; cathodic protection; analytical procedures; stress-rupture properties of some platinum and palladium alloys; a silver electroplating anode, and metallo-organic films on refractory materials.

ELECTRICAL RESEARCH ASSOCIATION, Cleeve Road, Leatherhead (Surrey)—Forty years of progress is reported in the association's report for the year 1960. The association was founded by the Institution of Electrical Engineers, the British Electrical and Allied Manufacturers' Association, and the Department of Scientific and Industrial Research, and during the 40 years of it existence it has made major contributions to the advance of the electrical industry. The report runs to over 100 pages and gives full details of current research work.

ZINC DEVELOPMENT ASSOCIATION, 34, Berkeley Square, London, W.1—The English edition of the first issue of the bulletin of the European General Galvanizers Association has now been published and is labelled winter 1960-61. French, German, and Italian editions are also being published. The bulletin is intended for users of galvanized steel. In the first issue, the main articles dealing with railway applications, with steel-framed buildings, and with progress in the galvanizing industry have been contributed by Dutch, Italian, and German authors. A news section briefly describes and illustrates a number of unusual applications.

JACK OLDING & COMPANY, LIMITED, Hatfield (Herts)—The Barber-Greene model 824 stabilization plant, owned and operated by Cementation, Limited, at its site on the disused Detling Airfield, near Slotbury (Kent), is producing all the lean mix concrete being used in widening roads in connection with the Medway towns by-pass. The plant was manufactured by Jack Olding & Company at Hatfield for Barber-Greene Olding & Company, Limited, and is the first of its kind to be produced in the UK. Under favourable conditions this machine can produce up to 180 ton/hr. of stabilized and granular base materials. The equipment is described in a new brochure.

HUNTINGTON, HEBERLEIN & COMPANY, LIMITED, Simon House, 28-29, Dover Street, London, W.1—The new laboratory-size Herreshoff furnace is fully described and illustrated in an attractive brochure. For 50 years the furnace has been used for roasting, calcining, and desulphurizing for the chemical and metallurgical industries. One of the most interesting uses of the furnace is as a research unit in the chemical industry and it was to meet the increasing requirements of research and development departments that the company recently redesigned its laboratory-size multi-hearth Herreshoff. The new furnace is larger than its predecessor and incorporates superior refractories.

MAVOR & COULSON, LIMITED, Bridgeton, Glasgow, S.E.—At Charleroi, near Pittsburgh, is the works of the Lee-Norse Company, manufacturers of coal cutting and loading machines. The American company has agreed that Mavor & Coulson shall make its mechanical miners, or developments of them, and have sole selling rights throughout Europe, Africa, India, Malaya, and elsewhere. M & C has recently supplied the National Coal Board with the first of these machines in Europe, this particular machine having been imported except for the motors, which were made by M & C. The Lee-Norse equipment is the subject of an illustrated article in the spring number of the M & C Apprentices' Magazine (3d.).

NATIONAL COAL BOARD, Chancery House, Chancery Lane, London, W.C.2—"Our sales drive is vitally important to anybody who lives by coal," says the chairman of the NCB in his monthly message in the May issue of "Coal" (4d.). "In the past few years the industry has taken some hard knocks from rival fuels," Mr. Robens continues. "We do not intend to take this lying down. We fought back hard in 1960. We intend to fight back harder still in 1961. And we are really turning on the heat this spring." In December this year output from mechanized faces is expected to reach 50 per cent. of the total national output. In the next five years it should be half as much again. The background story on mechanization is told in "More Power for the Pits," while "Machines to Their Aid" tells how Pye Hill Colliery (Notts), now fully mechanized, "shows once again what can be done by machines—and human enterprise."

STEWARTS AND LLOYDS, LIMITED, Structural Steel Sales Department, Broad Street Chambers, Birmingham 1—"Rectangular Hollow Sections," a new brochure, covers all sizes and properties in the hot-finished welded and hot-finished seamless ranges produced by the company. It is attractively produced in colour and profusely illustrated with appropriate diagrams, notably under the heading of applications. As the introductory notes point out, for the past two decades round tube has been used as a hollow section for structural and mechanical purposes by fabricators equipped with the machines necessary for manipulating and welding tubes. As the range of hollow structural steelwork increases, a variety of new hollow sectional shapes will be required, and to meet this requirement the company, in conjunction with its subsidiary, Tubewrights, Limited, has developed the rectangular hollow section (RHS). The booklet deals with the properties and standards to which RHS are manufactured, covers the extensive range of sizes produced, and demonstrates their advantages over other sections.

Locating the Centre of Gravity

Prepared at the request of the Federation of Manufacturers of Construction Equipment, a new standard (BS 3318) gives well-tried, simple methods suitable for determining the centre of gravity and the overturning angle of most heavy objects, from a grabbing crane to a tractor. It will be of practical assistance to designers, manufacturers, and customers alike and should make an important contribution to the reduction of those accidents caused wholly or in part by unstable equipment or vehicles. Copies of the standard, entitled "Methods for Locating the Centre of Gravity of Heavy Objects," may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1 (price 5s.).

TECHNICAL DEVELOPMENTS IN MINE RESCUE WORK

Report of Superintendents' Conference Held at Wolverhampton

MR. J. G. BELFITT

RECENT developments in self-containing breathing apparatus and methods of sealing off districts or isolated areas were the main topics of discussion at the 1961 conference of mine rescue superintendents, held at Wolverhampton last week. The conference opened on Monday with an official welcome by Mr. J. G. Belfitt, deputy production director (operations), West Midlands Divisional Coal Board.

On each of the three days of the conference the superintendents attended technical sessions and visited works of manufacturers for the mining industry in the North Staffs, Cannock Chase, South Staffs, and Warwickshire Areas of the division. The West Midlands Divisional Coal Board acted as hosts for the duration of the conference.

At the first technical session, at the Valley Training Centre, Hednesford, near Cannock, after an address of welcome by Mr. H. U. Carr, deputy Area production manager (operations), a paper on an underground fire incident at Granville Colliery was given by Mr. Belfitt and Mr. W. E. Raybould, divisional chief scientist. Brief details of the events leading up to the fire in a district where methane drainage was being practised were outlined and the interpretation given of the result of the analysis of gas samples taken both at the seat of the fire, through the methane drainage pipes, and in the pit bottom. The circumstances of the incident, caused by an ignition of firedamp, were somewhat unusual in that a comparison could be made between the products of combustion at the seat of the fire and at the main stoppings in the pit bottom.

After a period of 10 days, during which time the pit was closed except for rescue operations, a state of quiescence was reached and the stoppings were breached, allowing the district in which the fire occurred to be isolated and production to be resumed.

Rescue Apparatus Developments

After being welcomed by Mr. L. W. Fletcher, deputy Area production manager (operations), developments in rescue apparatus were discussed at the second technical session in the North Staffs Area, following talks by Mr. J. S. Marshall, Senior District Inspector of Mines, and Mr. C. R. Sennick, chief scientific officer, Safety in Mines Research Establishment. Mr. Marshall devoted much of his talk to the experience of other mining countries in the use of self-rescue apparatus, following inquiries by the Ministry of Power. Mr. Sennick described the work of the SMRE in the development of a new type of liquid air self-contained breathing apparatus which was now undergoing approval by the Ministry of Power.

The mine rescue superintendents' final technical session was held at the Warwickshire Area Training Centre at Birch Coppice Colliery, where, after a welcome by Mr. G. S. Milne, deputy Area production manager (operations), they saw a demonstration of latex spraying and the use of an inflatable seal. Both these techniques had been developed in the Warwickshire Area, where coal seams were liable to spontaneous combustion and the rapid construction of stoppings and prevention of leakage through goaf areas played an important part in the safety of mines. Following the demonstration talks were given by Mr. R. R. Stapleton, manager, latex development, Dunlop chemical products division, on the application of latex spraying in mines, and by Mr. W. G. Gorham, manager, special equipment, aviation division, Dunlop Rubber Company, Limited, on the development of the inflatable seal.

Visits were made to the works of the English Electric Company, Limited, at Stafford, Cowlishaw,

Walker & Company, Limited, Biddulph, Stoke-on-Trent, and the Fort Dunlop works of the Dunlop Rubber Company.

Speaking at a dinner for the mine rescue superintendents at the Victoria Hotel, Wolverhampton, on Tuesday, Mr. Belfitt said that much progress had been made in rescue work since the last conference was held in the West Midlands Division eight years ago. The coal-mining industry was contracting to improve its efficiency and this had affected the organization of rescue work. The Dudley Rescue Station had been closed and moved to Hednesford, and in North Staffs the closure of Berry Hill Colliery had provided an opportunity to use its pithead baths for a new rescue station. Chambers had been provided to give rescue workers experience in working in hot and humid atmospheres and all stations in the division were connected by VHF radio.

Spontaneous combustion was a problem in the West Midlands Division and the board had decided to have a higher proportion of trained rescue men at pits where this phenomenon was experienced. "Nature is never very kind when a disaster is near," said Mr. Belfitt, "but the board is conscious of the need to provide the best apparatus."

Balance Between Production and Sales

Dr. J. Smillie, production director of the West Midlands Divisional Coal Board, in response to a toast by Mr. H. Astle, rescue station superintendent, Cannock Chase Area, said that the division had reached a state of balance between production and sales following a period of over production. Productivity was now over 30 cwt. and a higher rate of mechanization was being achieved. The future was full of promise, said Dr. Smillie, and despondency should now be withdrawn.

Adequate preparation to ensure consistency of quality was an important aspect in increasing sales of coal and the divisional board had embarked on a sales campaign partially directed towards the domestic market for the increased use of coal for central heating.

Men were needed to man machines, said Dr. Smillie, and it was difficult to make the industry as attractive as others. These factors made it necessary to ensure that every man was fully utilized and selective mechanization must be applied to secure a return for the capital that had been invested.

Within the coal-mining industry, there had been changes in methods and equipment, but despite all these developments, there were still hazards from gas, spontaneous combustion, falls of ground, etc. While these hazards existed, the rescue service would still be needed, and Dr. Smillie thanked rescue men and the superintendents who trained them for their service to the industry.

A PHOTOGRAPH of Miss Jenny Dawson, a well-known model, will no doubt adorn the walls of many offices for the next 12 months. Miss Dawson is the subject of the AEI Girl Calendar for 1961-62, which starts with the month of April.

Instrumented Coal Plough in South Wales

THE Wesfalia rapid plough has probably a greater potential on a given face than any other type of coal-winning machine at present used in Great Britain, and the extension of its use to seams hitherto considered unploughable is a matter of some urgency and importance.

In order to assist in the understanding of the ploughing process, experiments have been carried out at two collieries in South Wales where the rapid plough has already established itself as a successful production machine. The results of the experiments are described in a paper by L. Finkelstein, W. T. A. Morgans, C. D. Pomeroy, and V. M. Thomas, published in the proceedings of the South Wales Institute of Engineers, Vol. LXXVI, No. 1.

The existing plough was replaced by a plough that had been modified in such a way that the haulage forces on the plough base and the three orthogonal components of the total force on the cutting head could be measured electrically and recorded continuously on a photographic film as the plough moved along the face.

The strength of the coal was determined both in the seam, using the MRE Penetrometer, and in the laboratory, using the MRE impact strength apparatus. The results have emphasized the importance of certain aspects of the ploughing process, although a full assessment of the data obtained will not be possible until similar experiments have been carried out on a range of coals throughout Britain.

COLLIERY ACCIDENTS

FATALITIES caused by accidents at mines under the Mines and Quarries Act, 1954, in the first quarter of this year totalled 68, compared with 63 in the previous quarter and 72 in the first quarter of 1960. The number of persons seriously injured was 347, compared with 439 in the previous quarter and 441 in the first quarter of last year.

Details are given in the following table:—

	Number of persons killed during the 13 weeks ended:		Number of persons seriously injured during the 13 weeks ended:	
	April 2, 1960.	April 1, 1961.	April 2, 1960.	April 1, 1961.
Underground—				
Explosions of firedamp or coal dust	—	—	—	2
Falls of ground ..	41	37	174	124
Haulage	15	17	123	104
Miscellaneous (including shaft accidents) ..	7	7	84	69
Total	63	61	381	299
Surface—				
All causes	9	7	60	48
Total underground and surface	72	68	441	347

BISRA JUNIOR STEELMAKING CONFERENCE

Deoxidation Practice for LOW-CARBON RIMMING STEELS

by **DR. D. P. RODERICK**

(Steel Company of Wales, Limited)

This is the final paper of the 14th BISRA Junior Steelmaking Conference held at Scarborough on June 22 and 23, 1960. After discussing deoxidation practices for rimming steel in a general way, the author describes a method of deoxidation of the steel during teeming by suspending rod aluminium vertically in the mould. As a result of this practice the incidence of two types of defects which occur in rimming steels was reduced markedly.

INTRODUCTION

THE low-carbon rimming steel discussed in this paper is the grade demanded for extra-deep drawing purposes. It is a steel which has, for many years, been produced predominantly by the O-H process, a typical percentage analysis being C 0.06, S 0.025, Mn 0.32, P 0.012; N 0.005. The latter constituent is important and the fact that the O-H process normally produces steel of this nitrogen content accounts for the preference for its product in the past for extra-deep drawing and stamping applications. The oxygen converter processes have, however, changed this situation. Nevertheless, this paper will be limited to deoxidation practice for low-carbon rimming steel produced by the O-H process.

In general, the deoxidation of this steel is carried out in the ladle by adding ferro-manganese and aluminium. The chief means of varying the deoxidation is by varying the amount of aluminium added because the amount of the FeMn addition is governed by the need to finish with 0.32 per cent. Mn in the steel.

During the making and casting of rimming steel there are many details of practice which have important effects on the state of oxidation of the steel and hence on the deoxidation required, that is, on the amount of aluminium to be added to the ladle. Thus, it is not surprising that the methods used for calculating the amount of aluminium to be added differ from works to works.

In most of these calculation methods the iron content of the slag figures strongly, but, as evident from the 9th Report on the Heterogeneity of Steel Ingots (ISI Special Report No. 27), the following factors influence and are taken into account at some works in calculating the deoxidation addition:—Iron content of slag; going-on carbon; temperature; bath analysis; nozzle size; ingot size and rate of teeming.

Whatever method is used to assess the degree of deoxidation it is usual to make the main deoxidation addition in the ladle with the deliberate intention of leaving the steel in a slightly under-deoxidized condition so that a relatively small addition to the steel in the mould will bring it to the correct condition for the desired ingot structure.

This practice is due to the fact that steel which is over-deoxidized in the ladle cannot be satisfactorily corrected in the mould and rising ingots with thin skins result.

The correcting addition at the pitside usually takes the form of aluminium pellets thrown in by the pitman according to his visual and aural estimate of the condition of the steel.

Deoxidation Practice at the Steel Company of Wales, Limited

For open-hearth extra-deep-drawing steel at the Steel Company of Wales, Limited, the calculation of the deoxidation ladle addition is based on the bath carbon content 10 minutes before tap, the rate of decarburization, and the iron content of the slag. The pitman's addition to the mould is made to obtain a good rimming action in the metal at the top teeming level and, when using open moulds, a manageable solidifying top for good plating; in this case the ingot scum is flicked off the top before plating.

The amount of aluminium added to the moulds varies considerably and it is not easy to make the addition with a high degree of regularity. This being so it is readily accepted that some steel defects might be associated with the way in which aluminium is added in the mould.

"Surge Shell" and Dryness

There are two types of defects which are obvious subjects for investigation. The first of these is illustrated in Fig. 1 and is known in this works as "surge shell," being similar to the "recurrent or surging lap" defect described in the BISRA report* on steel defects. "Surge shell" is invariably associated with a sink in the metal level during filling of the mould which leaves a thin chilled sleeve around the mould wall. On further teeming this sleeve, having an oxidized surface does not fuse completely with the liquid metal and a sub-surface defect is thus formed. Such a defect will only be removed in the soaking pits if there is excessively heavy scaling. When the ingot is rolled to a slab this "surge shell" is transformed into the surface mark shown in Fig. 2, which has to be removed by scarfing.

The second of these defects is revealed at the slab stage and in this works is usually designated as "dryness." It is illustrated in Fig. 3 and is very much akin to the "spongy surface" defect described in the BISRA report already referred to. The appearance and severity of this defect appears to be influenced by the soaking pit operation. In general, it consists of areas of the slab having numerous small oxidized breaks in the surface

* ISI Special Report No. 63.

FIG. 1.—INGOT SHOWING SURGE SHELL MARK.

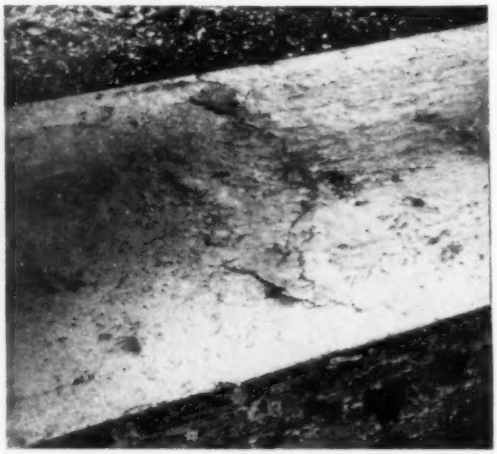


FIG. 2.—SLAB SHOWING A SURGE SHELL MARK.

which sometimes necessitate considerable scarfing (see Fig. 4) before a solid surface is obtained.

As its name suggests, the defect "surge shell" has instinctively been associated with the surging action of the steel—particularly rimming steel top-teemed—during the filling of the mould. Furthermore, it is well known that an aluminium addition to rimming steel in a mould often has an immediate and powerful result. The surging steel sinks quickly as soon as a few pellets—literally two or three—fall into it and, in consequence, a thin shell of steel is formed on the mould wall. This, of course, becomes submerged as teeming continues.

Special observations were made of the teeming of ingots of 18 normal casts of rimming steel. The time of adding aluminium to the mould was related to the height of the steel in the mould and subsequently compared to the occurrence and location of surge shell defects: a strong correlation between aluminium addition and the defect was revealed.

The results of these observations are given in Table 1. Of the 236 ingots observed 102 showed

TABLE 1.—*Results of Investigation of "Surge Shell."*

No. of ingots observed	236
No. of ingots from which slabs show surge	102
Distribution of this surge:	
Top	66 per cent.
Middle	7 ,,
Bottom	27 ,,
Proportion of surge coincident with Al addition	68 per cent.
Proportion of surge not coincident with Al addition	32 per cent.

surge defects. Sixty-eight per cent. of the surge defects were coincident with the level at which aluminium had been added. One could argue that the addition of aluminium was the result of seeing a surge, but while this may be true in a few instances, most of the time it was not possible to see the metal surface and the aluminium additions were made almost habitually.

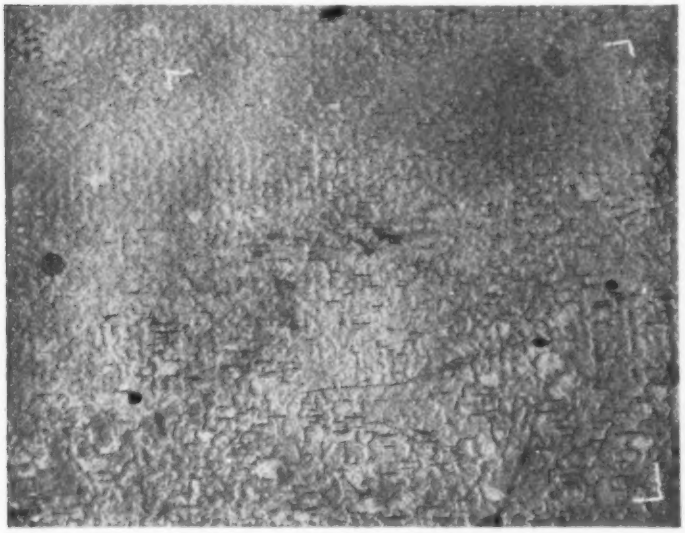


FIG. 3.—DRYNESS ON A HOT-ROLLED SLAB BEFORE SCARFING.

The cause of the defect "dryness" cannot be diagnosed by visual examination of the ingot, but a clue is obtained by examining the sub-surface condition of the ingot. The technique of corner sampling is useful for this: it is found that the sub-surface revealed by this technique varies from one having numerous blowholes just beneath the surface to one that is completely solid for a depth of 1 in. or so. Fig. 6 shows the structure of a corner sample taken, at about one third height, from an ingot which subsequently showed "dryness" in the slab. The surface of the ingot was spongy in so far as at a distance of $\frac{1}{8}$ in. under an apparently sound surface there were small blowholes quite divorced from the primary blowholes by a sound layer of metal. These blowholes were of the right size and distribution to be a potential cause of subsequent dryness in the slabbing mill. It is logical to think that when some of the surface of the ingot is removed as scale in the soaking pit that some blowholes—depending on their depth below the surface—will be exposed and oxidized. In other words they could cause the "dryness" defect on the slab.

To see whether these blowholes were a phenomenon of gas evolution from the metal as it solidified rather than a result of gas originating at the mould wall either from the mould coating or moisture on the surface, clean mild steel and copper bars were dipped into ingots under the following conditions:—(*a*) During filling before a rimming action had developed; (*b*) after a strong rimming action had developed.

The bars were withdrawn after an immersion time of 10 sec. and sawn and polished to show the structure of the apparently solid steel envelope.

Typical results are shown in Fig. 5, in which the sections of solidified steel can be considered as the reverse of the ingot surface. The section on the left is typical of one taken under condition (*a*), that is, before a rimming action had developed and the other one represents condition (*b*). It is evident that subsurface blowholes are associated with the absence of a strong rimming action.

Regularity of Aluminium Additions

The two findings, namely that "surge shell" is associated with the time of adding aluminium pellets to the mould and that "dryness" is associated with the rimming action during teeming have a common factor, namely, the aluminium

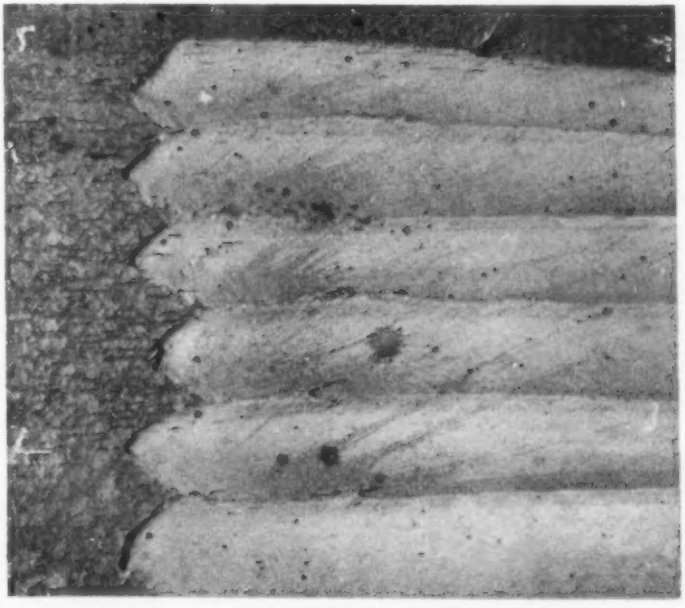


FIG. 4.—DRYNESS ON A HOT-ROLLED SLAB AFTER SCARFING.

addition to the mould. Both surging and rimming action are strongly influenced by the amount of aluminium added and it therefore appears important to add the aluminium regularly and adequately.

The next step was to introduce a method of adding aluminium regularly throughout teeming. This is not a new approach, as it is known that some works in America have devised methods, such as a pistol device, for injecting pellets at frequent regular intervals. The method chosen for trial and finally adopted at the Abbey O-H shop was to hang one or more aluminium rods down the narrow side of the mould wall.

Examination of corner samples from numerous ingots deoxidized by the use of various numbers of aluminium rods showed that a skin free from sub-surface blowholes could be guaranteed only if the amount of aluminium added was sufficient to give a persistent rim during filling. When this condition was achieved the occurrence of surge shell also fell to negligible proportions.

FIG. 5.—SECTIONS THROUGH SAMPLES ON A MILD-STEEL BAR TAKEN FROM INGOTS DURING FILLING. LEFT: FROM OVER-OXIDIZED INGOT BEFORE RIMMING ACTION HAD DEVELOPED. RIGHT: FROM VIGOROUSLY RIMMING INGOT.

Rods of various thicknesses were tried. The rate of teeming was about 10 ton/min. and the rate of rise in the mould was about 72 in./min. After considerable experimentation it was found that for these teeming conditions ¼-in. dia. rod was the most satisfactory because it did not melt until the steel came into contact with it and was then quickly consumed. Furthermore, a number of the rods could be suspended in the mould, the number being suited to the requirement of the steel. In this way the addition was uniform and as near to the optimum amount as one could reasonably hope to attain. By hanging the rods on the narrow wall of the mould entrapment of aluminous scum on the surface of the ingot was avoided.

TABLE 2.—*Relation Between Aluminium Addition and Rimming Action.*

Al added.	Action during filling.	Action at top teeming level.	Action after 1 min.
Nil ..	No rim ..	Surged over the mould top	Sank 24 in. Weak rim developed
22 oz ..	No rim ..	Surged slightly; weak rim	Sank 4 in. Weak rim
40 oz. ..	Weak rim ..	Fairly strong rim	Fairly strong rim
87 oz. ..	Strong rim ..	Strong rim ..	Strong rim. Build up at corners
127 oz. ..	Fairly strong rim	Fairly strong rim	Fairly strong rim. Build up at corners
167 oz. ..	Weak rim ..	Weak rim ..	Weak rim. Rising slightly
280 oz. ..	No rim ..	No rim, crusting over	Crusted over, rose slowly over mould top

These inferences were the result of many investigations including ciné-film studies of surging and rimming for different additions of aluminium. A study on a 200-ton cast made into 15-ton ingots revealed the definite relationship between rimming action and amount of aluminium added to the mould shown in Table 2. This shows that it is possible to produce oxidation levels ranging from that of a wild steel with a considerable surge to that of a genuine riser showing little or no rimming action.

The cast was teemed through a 2-in. nozzle. Tapping analysis was 0.045 per cent. C and 0.07 per cent. Mn, 27 cwt. of ferro-manganese was added to the ladle and a final pit analysis on a killed sample was 0.06 per cent. C and 0.28 per cent. Mn. The ingot size was 51 in. by 36 in. by 85 in., weighing 15 tons. Tapping temperature was 1,595 deg. C.

It will be noted that in the first three ingots the rim did not develop until after finish of teeming. There was a nett sink at top teeming level, decreasing with increasing aluminium additions. Corner samples were taken from all the ingots. Fig. 6 shows the structure of three of these. Fig. 6 (top) shows the structure of the sample taken from the first ingot, to which no aluminium was added. There is a marked layer of sub-surface blowholes at a depth of up to ¼ in. beneath the surface, then a solid layer of rimmed skin of about 1 in. before the primary rim blowholes. The first three ingots showed sub-surface blowholes which give the defect of dryness, the number of sub-surface blowholes decreasing with increasing aluminium.

Fig. 6 (centre) shows the structure of the corner sample from the fourth ingot to which 87 oz. of aluminium was added. This ingot had the strongest rim during filling. Here there are no sub-surface blowholes and the first inch from the surface is solid.

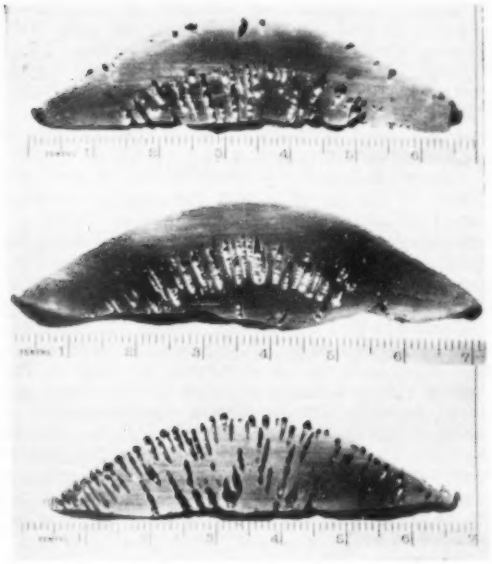


FIG. 6.—TOP: CORNER SAMPLE TAKEN FROM OVER-OXIDIZED INGOT. CENTRE: CORNER SAMPLE TAKEN FROM AN INGOT WHICH RIMMED CORRECTLY DURING FILLING. BOTTOM: CORNER SAMPLE FROM AN OVER-DEOXIDIZED "RISING" INGOT.

The corner sample shown in Fig. 6 (bottom) is from the last ingot which had 280 oz. of aluminium. The structure shows that this was a genuine riser with the primary blowholes close to the surface.

Observations and the evidence summarized above lead quite definitely to the conclusion that in order to avoid these skin blowholes the steel must rim during the filling of the mould. Furthermore, the most skilled operator cannot hope to make mould additions as evenly as is done by use of suspended rod.

The addition of aluminium by means of a rod suspended down the mould was accordingly adopted and routine records of ingot quality were carefully studied. The fluctuations of ingot quality with time expressed as a percentage of ingots showing any defect associated with over-oxidation had been recorded at the Abbey melting shop for some time past. Fig. 7 shows a plot of the routine record over the period of introducing the new practice. It can be seen that the change of practice has been accompanied by a marked improvement in quality. It should also be noted that a considerable reduction in coil edge cracking in the mill also occurred at this time.

The practical control of the rimming action in the mould has been discussed and conclusions have been drawn which enable a method of control to be devised. The action of the metal itself must now be considered.

Previous work has not provided a clear picture of the reaction taking place in ingots like 1, 2, and 3 (Table 2), which has the following characteristics. The metal does not rim during teeming. When a splash slops against the wall the metal does not wet the surface of the mould completely. The surface of the metal appears to "fry" and there is a characteristic noise. A few pellets of aluminium thrown in at this stage can cause a sink, the magnitude of which seems out of all proportion to the deoxidation potential of the aluminium. Sinking and surging may also occur without aluminium. After finish of teeming the surface of the metal has an oily swirling appearance and after a little time a mild rim will develop. Finally, the nett level of the solidified ingot will be well below top teeming mark.

There is nothing new about such observations and the condition has been mentioned several times in the literature—probably the latest being in the paper by Tenenbaum, Schrader, and Mair in JISI January, 1959, where, talking about continuous casting of low-carbon steels they mention: "Avoiding the excessive boiling and foaming that result characteristically when oxidized metal contacts a cold mould surface."

It is not difficult to build a crude picture of what happens. Carbon and oxygen may be close to equilibrium at bath temperature when the bath is tapped. In the ladle carbon may be added in the ferro-manganese and the oxygen increase during run-out and teeming may be of the same order as the oxygen content of the steel in the furnace.

After considerable cooling, this metastable liquid is agitated by pouring and there is rapid gas evolution, not just at the cold surface of the mould, but throughout the steel. The mould is thus filled with froth, some bubbles of which are trapped on the surface to give the type of blowhole shown. When the rapid gas evolution is finished the froth subsides and the steel behaves normally, gas being evolved only at the solidifying front and a rim is seen on the sunken surface.

These observations are not easy to explain. Is the bulk or random gas evolution in the liquid so vigorous that it masks any genuine rimming action occurring at the walls? Why should a few pellets of aluminium be capable of producing such

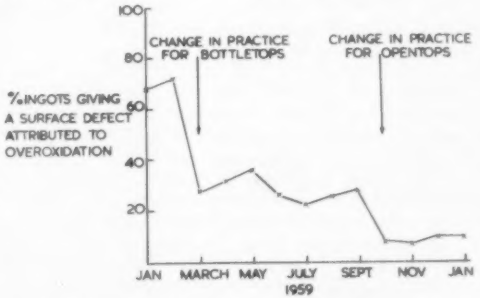


FIG. 7.—QUALITY CONTROL CHART SHOWING THE EFFECT OF THE CHANGE IN DEOXIDATION PRACTICE.

a rapid and pronounced effect on the froth? It has been suggested that this is simply a question of supplying nuclei around which bubbles of gas can agglomerate and, becoming larger, rise quickly.

To test this idea, additions of a large range of substances in finely divided form, have been made to such ingots with no effect at all. If the ingot just after teeming is a mass of liquid inflated by rapidly evolved bubbles, why does one get this oily, swirling and fuming surface, even, for instance, after a large sink as was obtained on ingot 1? (Table 2).

The rimming action, when it does materialize, is relatively mild. Does the bulk reaction that has been postulated consume so much carbon and oxygen that there is a delay, as in the classical theory, in build-up of concentration at the solidifying wall before a rim occurs? Is the level of carbon so low in this case that the rim never becomes strong? Sheet carbon analyses do not substantiate this idea.

Is there need then to postulate any auxiliary reaction of mechanism? Under the conditions of high oxygen potential suggested it is probable that a certain amount of manganese oxide would be generated concurrently with carbon monoxide. Would this give a film tending to stabilize the bubbles from a relatively small bulk reaction? And would a heavy resultant scum on the surface prevent pick-up of atmospheric oxygen to the ingot? Is it lack of atmospheric oxygen which limits the rimming action? Such a picture is rather tenuous because this scum should provide a reservoir of oxygen.

The role of atmospheric oxygen in rimming has, however, not been fully investigated. At a recent BISRA committee meeting, mention was made of experiments currently under way in Belgium where a blanketing current of nitrogen at atmospheric pressure is constituted over a rimming ingot, preventing access of air. The rimming action is said to stop. This has been confirmed in experiments carried out at the Steel Company of Wales. Experienced teemers will tell us that a similar effect can be caused by placing a sheet over the mould top under certain conditions.

These questions may seem academic since the theme of this paper is that the surging, foaming condition associated with the defects "surging" and "dryness" must be avoided during filling of the mould. They do show, however, that there are gaps in our knowledge of rimming steel which are worth filling.

There are two more observations which should be made. The first is that experiments have shown that if no addition of aluminium is made to the ladle a vigorous rimming action can be generated by aluminium additions to the moulds such that the total addition would be much less than would normally be used for an addition to the ladle apart from the fact that the ladle addition would probably require to be supplemented by small additions to the moulds. Are we wasting money by making ladle additions?

The second observation is that increasing aluminium additions are found to cause an increase in rimming action up to a maximum and then a progressive decrease. This does not fit in with conventional ideas. It is, moreover, reflected in the height of the primary blowholes, which are at a minimum on the strongest rimmer. Many of the questions raised above are currently the subject of co-operative investigation by members of the Steelmaking Division of BISRA and ourselves under the guidance of the BISRA Rimming Steel *Ad Hoc* Group.

LATIN-AMERICAN IRON AND STEEL INSTITUTE

IN the first year of its existence the Latin-American Iron and Steel Institute has performed a useful service by publishing a directory of the Latin-American iron and steel plants, with details of their key personnel, capital investment, production, main equipment, and expansion plans. The "Directory of Latin American Siderurgical Industries" may be obtained from the General Secretariat, Instituto Latino Americano del Fierro y el Acero. PO Box No. 13810, Santiago de Chile, at $ (US) 10 per copy.

Formed just over a year ago, ILAFA is an association of the following iron-producing countries:—Argentina; Brazil; Columbia; Cuba; Chile; Mexico; Peru; Uruguay, and Venezuela. One of its important functions is to enable the various companies to act together on matters of common interest. On behalf of the International Congress for Standardization held in Buenos Aires in September, 1960, it has undertaken the preparation of recommendations for metallurgical standards. Other activities include the publication of a monthly bulletin, the organization of permanent metallurgical statistics, studies relative to a Latin-American Free Trade Zone, and analysis of legislation on siderurgical production.

ILAFA has started to play a leading role in the iron and steel industries of Latin-America, which at present produce between 4,000,000 and 5,000,000 tons of steel per year, but consume about 8,000,000 tons. The Latin-American steelmakers are doing everything possible to increase production, particularly as it is estimated that the home demand will rise to 15,000,000 tons by 1970.

French Pig-iron Output Record

PIG-IRON production in France in March was at the record level of 1,321,000 tons, compared with 1,204,000 tons in the previous month and 1,239,000 tons in March, 1960, according to the Steel Industry Federation. The previous record was in January, 1961, with 1,284,000 tons.

Steel output for the first quarter of this year totalled 4,667,000 tons, representing an increase of 8 per cent. compared with the corresponding quarter of last year.

S & L's New

HORIZONTAL FORGING MACHINE

A NEW horizontal forging machine recently commissioned at the Mossend Tube Works of Stewarts and Lloyds, Limited, in Lanarkshire, was designed and manufactured by Lamberton & Company, Limited, Coatbridge. The prime purpose of the machine (also called an upsetter) is to upset the ends of heavy steel tubes used for lining deep oil wells. The upset of the ends enables a screw thread to be cut on the tube, male at one end, female at the other. Thus lengths of tubes are screwed into each other without the need of any coupling piece.

Tubes up to 10 in. dia. can be forged and, as a result, the machine is a very heavy one, having a total weight of about 300 tons and being capable of exerting a forging pressure of over 2,000 tons. The manufacturers believe that this is larger than any similar machine yet built in Europe. Because of its size, the main frame was made in two pieces, one piece being over 100 tons in weight.

The side slide which carries the gripping dies is operated through toggles by cams from the main crankshaft. This slide and the main slide are guided between anti-friction liners with automatic oil lubrication. The forging operation is made by a series of punches carried in the main slide which is driven directly from the crankshaft. The crankshaft is turned by a 250-h.p. motor through vee-belts and reduction gearing.

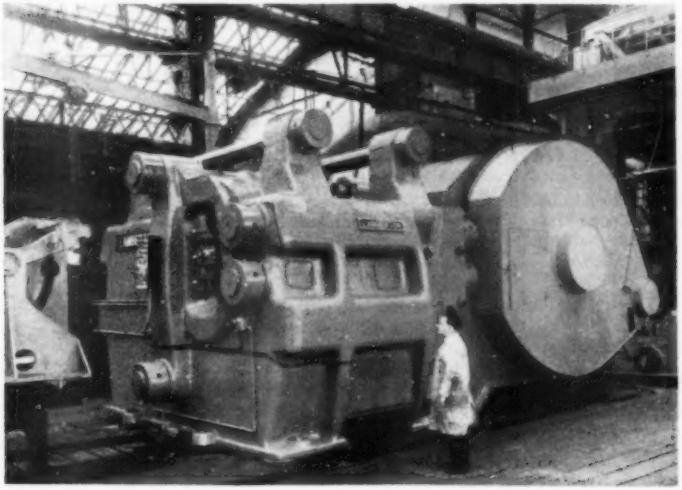
The stroke of the main slide is particularly long, being 30 in.

Since the operation of the machine requires one stroke only at a time, a multiple clutch and a disc brake are employed. These units are also designed and manufactured in Coatbridge and have been specially developed to stand up to the exacting duty of starting and stopping a large mass of machinery, some 15 times a minute. Both the clutch and brake are air-operated and so arranged that should there be a failure of air or electric power, the clutch disengages and the brake is applied.

Other safety devices to guard against overloads and misuse are incorporated.

The tubes to be processed are delivered from the end heating unit on to manipulator rollers. These raise the tube to the level of the first die position and then move it forward into the dies. After the first forging operation the manipulator lowers the tube to the second position and so on. The tube is thus manipulated through the forging cycle entirely by mechanical power.

A REVISED BRITISH STANDARD (BS 2789:1961) has been issued for iron castings with spheroidal or nodular graphite. Six grades of iron casting are dealt with in the specification, which covers the provision of test samples, mechanical tests, and mechanical properties.



The New Horizontal Forging Machine at the Mossend Tube Works of Stewarts and Lloyds, Limited. The Photograph Shows the Side of the Machine Opposite to the Side Slide. The First Arm and Roller of the Manipulator is at the Left of the Picture.

PROGRESS IN SOLID FUEL RESEARCH

GOOD progress in research projects aimed at improving the competitive position of coal is recorded in the annual report for 1960 of the British Coal Utilization Research Association, which emphasizes the work done on the automatic industrial boiler and the small automatic chain-grate stoker for firing boilers heating large buildings.

The work on the automatic industrial boiler includes research on the handling of coal and ash; a 2-pass Economic boiler has been fitted with coal and ash handling plant and automatic controls, and its performance under varied conditions is being studied. Additionally, study of the effects of the content of fines and moisture in causing difficulty with the flow of coal has been continued with the aid of a model bunker and bucket elevator. Field trials of the small automatic chain-grate stoker using coal of size below ½ in. during the 1959-60 heating season were satisfactorily completed, high efficiencies and savings in fuel costs being recorded. Under an agreement with the association, arrangements for the commercial development of the stoker and associated equipment are in the hands of the National Coal Board.

Work under contract for the Ministry of Power on complete gasification of coal, commended by the (Wilson) Committee on Coal Derivatives, has continued, special emphasis being placed on developments likely to lead to high thermal efficiency and throughput, and to reliable performance, especially in respect of slag removal. Measurements of the temperature-viscosity characteristics of slags, from the experimental gasifier and from cyclone-fired boilers, have been made and their correlation with chemical composition studied.

A preliminary study of the distribution of incombustible matter in the size of fractions of pulverized coal below 200-mesh has thrown light on the association between the mineral matter and the pure coal substance; the work is continuing.

In research aimed at improving the availability of water-tube boilers, emphasis has been placed on further studies of deposit formation; experiments in the laboratory have been done on equipment burning from ¼ lb./hr. to 50 lb./hr. of pulverized fuel. Research to improve efficiency in the use of producer gas has continued, and one of the examples of service to members reported is assistance in an investigation of the use of oxygen for reducing sulphur pick-up by the change in a producer-gas-fired steel melting furnace.

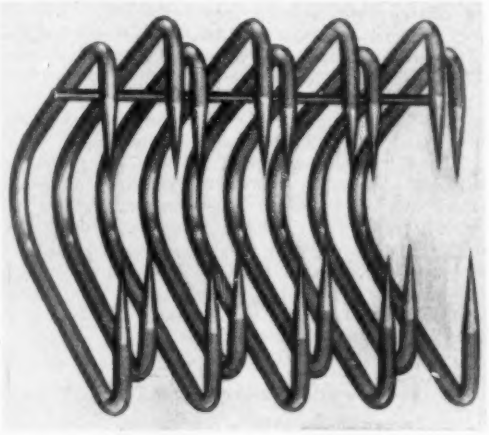
Measurement of grit and dust leaving an Economic boiler has shown the extent to which increasing the flue gas flow rate increases the rate of emission.

Further advance has been made in understanding the structure of the coal molecule. Work on the mechanism of coking has included more detailed study of the thermal stability of the fusible volatile solids obtained by vacuum carbonization of coals.

New Comet Belt Fastener

WHILE colliery managers have been quick to realize the advantages of the new high-tensile premium beltings, many have been equally quick to complain that little more than half of the extra strength they are paying for can be used, the fastener either pulling out or tearing away long before the tensile strength of the belt is reached. Strengthening the fastener merely by increasing the gauge of the wire did not provide the answer. By working towards a stronger joint rather than merely a stronger fastener, Mastabar Mining Equipment Company, Limited, has developed a completely new fastener—the P.15—which will enable 15 per cent. more of the new beltings' extra strength to be used.

The makers admit frankly that no fastener will enable all of the premium beltings' extra strength to be utilized, but feel that users may as well have



THE COMET P.15 BELT FASTENER.

the advantage of the extra 15 per cent. while research is directed towards producing an even more efficient fastener.

While the P.15 does use a slightly heavier wire, this has not been increased as much as might have been expected. The Comet P.15 fastener's stronger joint has been achieved by experimenting with varying leg-length, point-length, and pitch; keeping a careful eye on the analysis of the wire, until a wedge-action clench could be secured within the thinner belts. It is claimed that this "wedge-action clench" disturbs the structure of the belt so little, and holds the reinforcing weave so securely, that there is no weakening of the belt, as must occur with heavier-gauge fasteners.

Mastabar states that while research is continuing, it is not expected that there will be any notable improvement on the P.15 fastener for some while.

Steel Stocks Rise

HOME CONSUMPTION EQUAL TO LAST YEAR'S AVERAGE

DURING the first quarter of 1961, total stocks of steel held by users and merchants were still rising although the estimated increase of 60,000 tons was considerably less than the rise of 250,000 tons a quarter throughout 1960, states the Iron and Steel Board. The rise in stocks during the first quarter of 1961 was not uniform. The returns so far received from the census of steel stocks taken at the end of March, covering about half the total use of steel, show reductions in some industries, notably the motor industry, offset by rises elsewhere including a substantial increase in merchants' stocks.

If the rise in stocks so far indicated is representative of the whole field, the use of steel in the home market during the first quarter can be assessed at a seasonally-corrected figure of 3,720,000 tons, equal to the average quarterly rate during last year, says the board.

Figures giving deliveries of the various types of finished steel from home production during the quarter show that deliveries of heavy steel were on an upward trend and in the case of plate in particular there was a substantial rise, with an appreciable tonnage coming from the new mills recently completed on the north-east coast. Other light-rolled products, such as wire rods, sections and bars, and the thin flat products (strip, sheet, and tinplate), show falling deliveries as a result of some weakening in the pressure of demand.

There was a continuing strength of demand for steel for buildings, plant and machinery. On the other hand, a fall in deliveries to the motor trade reflected the low rate of car output during the winter months and, more recently the reduction in stocks. Deliveries to shipbuilding and the railways showed some recovery during the quarter from the low levels of the last few years, although there are indications that some of the increases may not be sustained.

Scottish Steel Stockholders' New Premises

SPECIAL building of 20,000 sq. ft., planned to meet the expanding needs of users of steel sheet in Scotland, is to be erected at the Caledonian Works, Rutherglen, Glasgow, of A. G. McFadden & Company, Limited, steel stockholders. Dean of Guild approval has been granted and work on the foundations will start before the end of the month. The new building will serve the developing motor-car industry in Scotland, which will require large quantities of different grades of sheet in various sizes, as well as the growing number of light industries. The basic sheet steel will be supplied in bulk from the strip mill under construction by Colvilles, Limited.

The building will be used for the storing and handling of sheet, ranging up to high quality standards, which require to be kept in conditions as free from rust and dust as possible. To achieve this, the steelwork has been designed by the company's subsidiary, Donald Clerk & Son, Limited, to reduce dust collecting framework to a minimum.

Higher Steel Prices "Inevitable"

STEEL as a basic commodity has done more than any other product to maintain price stability in the UK, said Mr. R. S. Bruce, retiring president, at the annual meeting of Sheffield Chamber of Commerce on Monday. Costs, however, had been forced up by outside influences, all of which had been approved by the Government, and as a result the industry had had so far to absorb £33,000,000 in increased costs—a serious development, which would inevitably be reflected in selling prices at some future date.

Mr. Bruce, formerly managing director of G. & J. Hall, Limited, Sheffield tool manufacturers, was succeeded as president of the Chamber by Mr. D. A. Senior, managing director of George Senior & Sons, Limited, steel manufacturers and forgers, of Sheffield, which was founded by his grandfather, Ald. George Senior. Mr. Senior, who is 54, entered the family business on leaving school. He has been a director of the Sheffield Forge & Rolling Mills Company, Limited, and of the Low Moor Alloy Steelworks, Limited, and is present chairman of W. E. Amies & Company, Limited, plastic moulders, of Sheffield. He joined Sheffield Chamber of Commerce in 1949 and has been chairman of its Fuel Committee since 1955.

RICHARD THOMAS & BALDWINS' IRONSTONE APPLICATION

SPOKESMAN of Richard Thomas & Baldwins (Mineral Recovery), Limited, whose application to develop open-cast ironstone working in North Oxfordshire was rejected by the Minister of Housing and Local Government, Mr. Henry Brooke, last week, said after the decision was made known: "We were quite satisfied to leave the decision to the inquiry inspector and the Minister. We have every confidence in their integrity." He said that at the moment he could not disclose the "other ways" mentioned at the inquiry which the company could take to meet the requirements of the customer if the application failed.

Mr. Brooke, in announcing his decision, said: "There is no evidence that the needs of industry make it essential to work these areas."

BRITISH STEEL CONSTRUCTIONS (BIRMINGHAM), LIMITED—Mr. Bernard J. Owen has joined the board.

New Nickel Markets Sought by INCO

STRENUOUS efforts to develop new markets for nickel are being made by the world's largest producer of the metal, International Nickel Company of Canada, Limited, now that its capacity is comfortably ahead of demand.

MR. H. S. WINGATE

Chairman Mr. Henry S. Wingate said in London last week that his own company's annual output would be raised by 75,000,000 lb. to 385,000,000 lb. by the end of the year—nearly two thirds of the world's total nickel capacity of some 600,000,000 lb. Although stainless steel still accounts for nearly a third of total consumption, the company hopes to expand other uses so that the demand for nickel grows faster than industrial production as a whole.

Mr. Wingate, who was in Europe to attend a marketing conference of all the company's selling agents in Holland this week, said that since the last such conference in 1956 the nickel market had been transformed from scarcity to surplus. The outstanding event had been the completion of the Thompson mine in Manitoba, which was officially opened last March.

In the UK, the company is pressing ahead with its new alloy plant at Hereford, one of the most modern in the world. It has involved an investment of some £30,000,000. At the same time the capacity of the refinery in South Wales has been expanded from 48,000,000 lb. a year to 80,000,000 lb.

Despite the lower earnings of International Nickel for the first quarter, Mr. Wingate expected those for the year as a whole to be about the same as in 1960.

Coil Spring Makers' Conference

TO keep a step ahead in the increasingly competitive export market, the British spring industry must work for efficiency in sales, administration, and technical development. Speaking to 80 delegates at the Coil Spring Federation's annual conference last Friday, the president, Mr. Robert Salter Bache, referred to the constant battle against rising costs which the industry had been fighting during the past year, in this country and in the export field.

Reporting on the first year of the Coil Spring Federation Research Organization's industrial liaison scheme, the director, Mr. Ronald Haynes, said membership had increased 15 per cent, and results from the scheme had already given guidance in research programmes.

YAWATA IRON & STEEL COMPANY, of Japan, has signed a contract with State trading authorities of East Germany to supply silicon steel sheet worth $(US)700,000 in return for 60,000 metric tons of East German pig-iron.

Orders Placed

Good Service Wins Export Order

COATBRIDGE firm of Martin, Black & Company (Wire Ropes), Limited, has evidence that prompt service brings export orders. A large order for wire rope for use in the Durgapur Steelworks in India went to the Continent, but because the delivery dates could not be met, the order was given to Martin, Black in view of good service with another recent bulk order for India.

The order, worth many thousands of pounds, involves 108,200 ft. of wire rope made up of more than 1,100 lengths of rope that vary from 1 in. to 5 in. in circumference. The wire for this order will come from the associate company, the Speedwell Wire Company, Limited, also of Coatbridge.

ORDER FROM GERMANY for machine tools worth £25,000 has been received by Lapointe Machine Tool Company, Limited, Watford.

JOHN BAKER & SON, LIMITED, high speed tool steel, file and twist drill manufacturers, of Sheffield, has received a pilot order from a Swedish firm for its Lighthouse and engineers' files.

AN ORDER from the Scottish Divisional Coal Board for a Wigan type 40 shaft signalling indicator system for installation at Lingerwood Colliery, has been received by Heyes & Company, Limited, Wigan.

GLASGOW VALVE AND SPRING manufacturers, Cockburns, Limited, has received an order valued at £500,000 from Italy for valve and control equipment. This is the biggest contract received by the company since 1948.

CONTRACT, valued at approximately £1,750,000, has been awarded by the Central Electricity Generating Board to British Insulated Callender's Cables, Limited, for the supply and installation of 132,000-volt underground cables in the London area.

ORDERS FOR steam turbine power units for the British United Shoe Machinery Company, Limited, and Glaxo Laboratories, Limited, have been received by W. H. Allen Sons & Company, Limited, Bedford. The value of the combined contracts is £42,000.

WATER PURIFICATION engineers, of Rickmansworth (Herts), Wm. Boby & Company, Limited, are expecting a contract, valued at more than £150,000, to supply, deliver, and erect four large de-aerators, one for each of the 500 mW turbo-alternators which the English Electric Company, Limited, is building.

ALL THE 3.3 kV and 11 kV mains cables for the Scottish Gas Board's new high-pressure plant at Westfield (Fifeshire) were supplied by Johnson & Phillips, Limited, of London, S.E.7. The cables included 3-core paper insulated lead alloy sheathed single wire armoured cables with P.V.C. overall, and single core cables with the same type of sheathing but without armouring.

WORTH £40,000, a contract to install 132 kV cables at Kincardine Generating Station has been awarded to Associated Electrical Industries, Limited, by the South of Scotland Electricity Board. AEI has also received an order from the New Zealand Electricity Department for eight 220 kV 5,000 mVA air blast circuit-breakers for installation at Aratiatia and Atiamuri. This contract, secured in the face of world-wide competition, follows the placing of an order last year by the New Zealand Electricity Department for eight 220 kV 7,500 mVA air-blast circuit-breakers of the same class for Maraetai I and II Power Stations.

ECE Steel Study

DIFFERENT MANUFACTURING PROCESSES COMPARED

DRAFT version of a study on the relative contribution to total crude steel output of the different steelmaking processes in the light of their respective economic and technical advantages, with particular reference to the growing use of oxygen, was discussed at the 25th session of the Steel Committee of the Economic Commission for Europe recently. A revised version of the study, which contains considerable technical and economic data, is expected to be published later this year.

The Committee, while giving the report a favourable reception, felt that some of the classical steelmaking processes were not treated with the attention deserved and that some modification of some chapters was necessary.

A further meeting of experts on the subject, who will include Dr. T. P. Colclough, technical adviser to the British Iron and Steel Federation, and Dr. A. H. Leckie, technical adviser to the Iron and Steel Board, will be held before the next session of the committee in September. The secretariat will report to the committee on the progress of the inquiry, and make its proposals for final publication.

Other Matters Discussed

Other matters discussed at the session included the work of the committee and its subsidiary bodies in the fields of productivity and automation of the iron and steel industry; statistics; the standardization of general conditions of sale for steel products; and a new inquiry into the use of steel in the building and civil engineering industries. On the latter subject, it is hoped that a provisional version of the inquiry will be put before the Committee at its next session in September.

The Committee approved the report of its working party on steel statistics and recommended for consideration by the 16th session of the ECE, a resolution designed to stimulate the availability of statistics on actual consumption and stocks of steel. It also recommended the publication of an annual bulletin giving data on export of iron and steel by products and destination.

The committee's work programme for 1961 includes an annual market review. Its long-term programme for the next two or three years, which will be considered at the September session, includes the effects of location on the economics of iron and steel making; the economic aspects of iron ore preparation; long-term trends in the replacement of steel by other materials; and a system of classification of alloy steels as a basis for a possible study on these steels.

Mr. H. W. A. Waring, general managing director of the G.K.N. Steel Company, Limited, was elected chairman of the committee for the third consecutive year, with Mr. F. Houdek, Vice-Minister, Ministry of Metallurgical and Ore Mining Industry in Czechoslovakia, as deputy chairman.

WORK HAS BEGUN at the new steelworks at Barnsley of C. G. Carlisle & Company, Limited, stainless steel manufacturers, of Sheffield. The main mill is expected to be working within a few weeks.

Oxygen's Rivalry with Coal in Steelmaking

BIGGEST competitor to coal in the steel industry was not oil, but oxygen, Mr. C. H. T. Williams, Master Cutler and chairman of the Park Gate Iron & Steel Company, Limited, told members of the Midland Institute of Mining Engineers at their annual dinner in Sheffield last Friday. The use of oxygen was developing rapidly and would revolutionize steelmaking on large and small scales, he said. This did not mean, however, that less coal would be used in the industry, because coal would still be used in ironmaking processes. Prospects in the coal industry were improving and he had every faith in the industry.

Mr. Richard G. Baker, deputy chairman of the North-eastern Division of the NCB, said the industry was returning to a concept of commercial competition. "The growing return of confidence in the industry should have no setback," he said. "Only one thing will stimulate customer confidence more than anything else, and that is rising productivity and falling costs."

The industry was carrying out a mechanization programme which was a formidable task and a big challenge, which must be met with singleness of purpose if it was to succeed. The man in the street might say that the recent signs of unrest in the Yorkshire coalfield did not augur well for this singleness of purpose. He assured them, however, that there was no conflict between any parts of the industry in its desire to raise productivity and at the same time reduce production costs.

Mr. Baker said he was not deterred at hearing oxygen referred to as a competitor of the industry, because as time went on more people would want the end products of the industry, such as electricity.

Other speakers included Mr. Robert A. Moore, president of the Institution of Mining Engineers; Prof. J. T. Whetton, president of the Midland Institute; Dr. F. V. Tideswell, vice-president of the Midland Institute; and Sir Charles R. Morris, vice-chancellor of Leeds University. During the evening, the Peake Medal, the highest award of the Midland Institute, was presented to Mr. Baker for his services to the Institute and to the coal-mining industry.

MANUFACTURERS OF milling machines and radial drills, Midgley & Sutcliffe Limited, of Leeds, reports a substantial increase in export orders over recent months. Since the company joined the George Cohen 600 Group, Limited, in 1955, its products have been shipped regularly to 22 different countries.

Cornish Tin Mine Project

"IT is perhaps ironical that there should be a School of Mines in Cornwall and only two operating tin mines in the county," said Mr. Douglas Frank at Penzance last week. He was appearing for Mr. W. T. Harry at an inquiry into Mr. Harry's application for planning permission to win and work tin ore at Carnellow Mine, near Zennor, Cornwall.

There was a world shortage of tin at the present time. Consumption exceeded supply and the price appeared to be rising almost daily, said Mr. Frank. Production from the mine could contribute towards meeting the world shortage and bring about price stability.

The West Penwith RDC and the Cornwall Mining Development Association support the application and the National Trust and National Parks Commission and county societies are against the proposal.

Mr. Harry, a mining engineer, proposes to carry out the project in three phases—exploration, development by sinking one or two new shafts, and the actual working of the mine which would be under the sea.

Mr. Harry told the inspector, Mr. H. Yeomans, that the people who were to put up the money would want to be assured that there was at least a £1,000,000 worth of tin there. He refused to answer a question by Mr. A. R. A. Beldam (for the National Trust) whether the interests who were prepared to back him were from the UK or oversea.

A letter was read from the Regional Controller of the Ministry of Labour to the County Planning Office which said that the Ministry would like to see the establishment of new undertakings in that part of Cornwall, but saw little prospect of being able to recruit 200 workers suitable for tin mining. The two mines on either side of Zennor had unfilled vacancies, and during the last six months only 11 men had been placed.

The inquiry was closed on Monday.

World's Largest Rolling Mill for British Aluminium

AS part of a £10,000,000 expansion programme at its Falkirk rolling mills in Scotland, British Aluminium, Limited, is to build a hot mill about 172 in. wide which will be the widest aluminium rolling mill in the world. Work will begin immediately and cold rolling and finishing capacity will be added as required. The new mill will triple Falkirk's present capacity of 50,000 tons a year, and will bring British Aluminium's total capacity in the UK to well over 200,000 tons.

British Aluminium, which is jointly controlled by Reynolds Metals, of the US, and Tube Investments, Limited, estimates that the use of aluminium will grow at least twice as fast as the average for industry as a whole.

DAVIDSON & COMPANY, LIMITED, manufacturers of fans and dust collectors, of Belfast, has completed an agreement with the German firm of Apparatebau Rothemühle, for the manufacture under licence of that company's regenerative air preheater. The licence extends to the manufacture and sale of this equipment in the UK and various oversea territories. This new Sirocco product will be marketed under the name of the Davidson Air Preheater.

Importing Natural Gas from the Sahara

SCHEME for the importation of natural gas (methane) on a large scale from wells in the Sahara, into Britain, where it would be used conventionally by industry as well as in homes, is now being prepared by the Gas Council and within a few days is likely to be submitted to the Minister of Power for approval. Sir Henry Jones, chairman of the Gas Council, said that it would mark the beginning of a new phase in the development of the gas supply industry. It could be developed in about three years to provide at least 10 per cent. of the gas at present supplied to the public by the gas industry in Britain.

The technical feasibility of the scheme has been provided by the experimental shipments of liquid methane to England from the Caribbean area, concluded just a year ago, when more than 12,000 tons of liquefied gas was distributed to consumers throughout the North Thames Gas Board's Area.

The Algerian gas field at Hassi R'Mel, discovered in 1956, offers a plentiful supply of methane, and negotiations between the two French companies concerned —the State-owned S.N. Repal, and the Compagnie Française des Petroles—and the Gas Council are nearing completion. With a guaranteed supply of Saharan gas and the Minister's approval of the scheme, it could be initiated without delay, said Sir Henry.

Ore Chartering

DESPITE the fact that there is still an active market from the Gulf to Japan, with rates, even for forward positions, continuing to move against charterers, this position has not to any extent influenced other markets. Nevertheless, if the continued drain on tonnage persists, it must eventually reflect elsewhere and there are signs of shortage of tonnage in other quarters.

Vizagapatam to Antwerp, Rotterdam, or Amsterdam secured second half May tonnage at 45s. f.i.o. and trimmed and there is a fair interest from this area. Durban/Japan fixed 16,500 tons for August at 53s. f.i.o. and trimmed, and manganese from Abidjan to Rotterdam reports 12,000 tons at 32s. for May and 10,000 tons to Montreal at $6.00 f.i.o., same position. Tonnage is not easy from the West African Coast. Pyrites reports Vassiliko Bay/Rotterdam at 25s. for 3,700 tons, May, and Morphou Bay to Ghent, 3,400 tons, second half May, at 28s.

Further tonnage to load sulphur has been taken up from US Gulf to Manchester at 54s. for 5,300 tons prompt loading, and phosphate from Tampa to Japan reports $11.00 for 13,500 tons, May 15/27.

ROBERT HUDSON, LIMITED, light railway equipment manufacturers, iron and steel founders, etc.—Directors state that the preliminary results of the subsidiary companies are encouraging, but the difficulties encountered by the parent company with fine margins of profit at the close of last year, have persisted well into the current financial year. These have been largely resolved and the company has a satisfactory order book with a reasonable margin of profit. While group profits for the year to June 30, 1961, are not expected to exceed those of last year, nevertheless, the directors recommend an interim of 4d. per 5s. share as a year ago when the final was 5d. per share.

IRON AND STEEL TRADE

RECENT tendencies show that while outputs at the blast furnaces, melting shops, and rolling mills are continuing at a high level, new orders are falling away slightly. Delivery periods now being quoted have shortened to a gap of merely four or five weeks in the case of beams, joists, and sections, and slightly longer in the case of plate. Producers are still able to fit orders received now into their delivery pattern before the end of the present quarter—a big change on the situation last year.

Pig-iron

The foundries are well covered for their needs as all grades of pig-iron are plentiful and present production is well up to likely demand in the immed'ate future. Forward buying is now almost a thing of the past as furnaces can give prompt delivery against orders arising.

The supply of basic pig-iron to the steelworks is adequate for current consumption and stock requirements, and makers could increase on present tonnages if the demand arose.

Finished Iron

Basis prices of manufactured iron have been raised by £1 12s. 6d. per ton as from May 1. Today's prices (bar basis 2¾ in. to ¾ in.) are:—

Crown iron: England and Wales (Zone 1), £51 12s. 6d.; Scotland, £51 7s. 6d.; Ireland, f.o.q. Belfast, £54 12s. 6d.; all other Northern Ireland ports, £55 12s. 6d., f.o.q. Cable iron £1 extra.

Ferro-alloys

The demand for ferro-tungsten continues steady, ferro-molybdenum is active, and a fair demand exists for ferro-vanadium. Interest in both ferro-silicon and ferro-chrome is maintained, and there is a good call for ferro-manganese and silico-manganese.

Ferro-titanium and ferro-niobium are in steady request and there is a fair call for chromium metal and silicon metal.

Semi-finished Steel

Re-rollers are finding no difficulty in getting hold of sufficient supplies of mild steel semis and the majority have reasonably good stocks. The call for alloy and carbon steels remains steady at a fairly high level.

The mills are obtaining good outputs of small bars and light sections and there has been some improvement in the call for strip and bright drawn bars while reinforcing rods and bars continue to enjoy brisk trade. Generally, however, order-books are not so heavy.

Finished Steel

There is still no sign of any immediate improvement in the demand for colliery requisites and further indents would be welcomed for benk and W bars, light rails, arches, pitprops, etc. Good commercial quality bright bars can be placed for reasonable delivery, but delivery dates for alloy and free cutting qualities are slightly extended.

Additional business would be appreciated for small angles, channels, and flats for inclusion in current and forward programmes as present demand is not up to productive capacity. The call for steel plates of all descriptions remains fairly high.

Cammell Laird Profits Recovery in 1960

WHILE group net profits in 1960 recovered sharply to £606,017 against £272,391, Sir Michael M. Denny, chairman of Cammell Laird & Company, Limited, shipbuilders and engineers, stresses in his annual review that the ultimate recovery of the group is dependent on a revival in shipbuilding and wagon building, both of which are still somewhat depressed.

The English Steel Corporation, Limited, had a successful year in 1960 with a greater volume of sales, somewhat higher profits, a larger order-book and the start of the new £26,000,000 development scheme at Tinsley. Nearly all sections of the group were well occupied and ended the year with a volume of orders in hand greater than that with which they started. With working capital, some £30,000,000 will be required for the Tinsley scheme, which is planned to be completed by the end of 1962. So far in 1961, production is being maintained and on present prospects this should continue.

The demand for products of the Patent Shaft Steel Works was high throughout 1960 and the order-book remained good, although since the end of the year orders have fallen off.

The output of railway vehicles by Metropolitan-Cammell Carriage & Wagon Company last year considerably exceeded the value of new orders received, which resulted in a fall in the volume of work in hand at the year end.

Scottish TUC Protest Over Locomotive Order

AT its meeting in Glasgow on Wednesday, the Scottish TUC expressed concern that the North British Locomotive Company, Limited, had been "completely passed over" and that a £5,000,000 contract for diesel locomotives awarded by the British Transport Commission had gone to an English firm.

In a statement asking why the Glasgow company, which faced a closure and the loss of nearly a thousand jobs this summer, did not share in the order, the Scottish TUC points out that all of the 88 locomotives ordered were for the Scottish region of British Railways.

ONE OF THE largest ropes of its kind made in Britain is being supplied by Wrights' Ropes, Limited, Birmingham, for the Finnish firm Oulu Oy. It is 3½ in. in diameter, almost 500 yd. long, and weighs 25 tons, and will be used on a large cable crane in a timber yard, replacing one supplied by Wrights' Ropes in 1937.

Coalfield News

Durham NCB Campaign to Stop Damage and Theft

CAMPAIGN to stamp out malpractices that jeopardize the safety and welfare of men employed at collieries has been opened in the Durham Division of the National Coal Board by the Divisional Coal Consultative Council. Letters have been sent to secretaries of colliery consultative committees and posters have been put up at the pits, seeking the co-operation of officials and workmen in dealing with cases of damage and theft of safety and firefighting equipment, and medical stores.

Signed by Dr. W. Reid, chairman, Durham Divisional Coal Board, and Mr. S. Watson, general secretary, Durham Area, National Union of Mineworkers, the letters list 25 cases reported in the past year of damage to firefighting extinguishers; stealing first aid equipment (or damage); attempting to break into morphia safes; deliberate damage to ropes and pilfering of safety equipment. The letter asks miners "to join in a general campaign throughout our county to stamp out these malicious practices."

A SURFACE reorganization scheme is to be carried out by Durham Divisional Coal Board at Bearpark Colliery.

HIGHER LEVEL of productivity is maintained in the Durham Division of the NCB. OMS overall in the 18th week of the year reached 23.40 cwt., compared with 21.99 cwt. in the same week last year. At the face, OMS was 66.49 (64.19) cwt.

SIXTY-SEVEN TRAINEES from seven collieries in the No. 3 (South East Durham) Area of the Durham Divisional Coal Board were successful in their recent St. John Ambulance Brigade first-aid examination at Horden Colliery mineworkers' training centre.

FOR THE SECOND TIME Auchincruive 4/5 Colliery (Ayrshire) has been awarded the direct transfer trophy of the Savings Bank of Glasgow. Mr. A. B. Dyet, manager of the colliery, received the trophy on behalf of the colliery at a presentation in Ayr.

VISIT OF Eton boys' to Killoch Colliery, Scotland, and the Tulip Festival at Spalding (Lincolnshire), where, according to the slogan on a flower-decorated float, "everything flourishes on coal," are featured in the June issue of "Mining Review," the NCB's newsreel.

ANNUAL RECITAL by the Nottinghamshire Miners' Festival Choir, under its conductor, Mr. Granville H. Mee, was given at evensong in Southwell Minster on Sunday. The recital was arranged by the Nottinghamshire District Welfare Committee of the Coal Industry Social Welfare Association, and the Nottingham Area of the NUM.

FOLLOWING a suggestion by colliery under-officials of the Amalgamated Central Association in the Nottinghamshire and Derbyshire coalfields, that all "rebel" unions should unite to form their own TUC, unrecognized trade unions, recruiting members from Government establishments and nationalized industries, are to meet in London, on May 27.

A NEW COALING WHARF being built at Keadby, north Lincolnshire, replaces the old timber structure which closed in 1958. Since then coal from the Yorkshire and Nottinghamshire coalfields has been shipped to other parts of the country from Goole (Yorks). When completed, in October, the new wharf will enable 12,000 tons to 15,000 tons of coal to be handled every month.

NUM to Protest Over Coal Imports

MEETING with the Minister of Power is to be sought by miners' leaders to protest against the application for a licence by the Steel Company of Wales, Limited, to import American coal, and for talks on fuel imports generally. This was decided on Tuesday by the executive of the National Union of Mineworkers which also registered a protest against the "efforts of foreign governments to sell fuel below world prices, thereby seeking a share of the British home market and underselling British coal in foreign markets by means of subsidies with which it is impossible to compete."

The union called on miners of all nations to protest against the "undercutting price strategy" of oil and other industries, and it was decided to continue pressure against British oil interests which "jeopardize the economy and safety of the nation by importing oil based on cheap labour."

Mr. S. W. G. Ford, president of the NUM, said after the meeting that industries were blackmailing the National Coal Board by demanding coal cheap, with the threat that otherwise they would get a licence to import low-priced foreign oil or coal. The union did not accept that British industry paid more for coal than European industry; there was no evidence of this at all. Some three quarters of British fuel requirements were now met by home-produced coal and greater dependence on imports, apart from the strategic danger, would raise problems of port capacity. In any event, the lower price of imported coal depended on the maintenance of freight rates at their present level.

Mr. Ford said the executive had not discussed a national strike if licences to import coal were granted, but the strong feelings against the proposal was by no means confined to the miners of South Wales. Miners regarded it as an attack on their industry.

Mr. W. J. Adcock to Head Merged NCB Branches

DECISION of the National Coal Board to amalgamate the mechanization branch and the strata control branch of the industry became effective on May 8. Mr. W. J. Adcock, formerly head of the strata control branch, will be in charge of the combined offices.

Mr. Adcock started his career as a mining student in 1944 with the Desford Coal Company, Limited, near Leicester, and later transferred to the South Leicestershire Coal Company, Limited. He continued with the company until nationalization.

He was an undermanager in No. 7 Area, East Midlands NCB, before becoming assistant divisional strata control engineer in January, 1951. Three months later he was appointed divisional strata control engineer and in June, 1958, he went to the headquarters of the board as head of strata control branch.

Mr. Adcock has read a number of papers to various professional bodies on the subjects of strata bolting, strata control research, and powered supports.

MINERS AT Fishburn Colliery (Co. Durham) have created a record by producing 12,543 tons of coal in a week. The previous best figure was 12,327 tons.

THE COAL TRADE

CONSIDERABLE variation exists from district to district in the level of demand for domestic fuels, but generally it compares favourably with previous years. "Phurnacite" maintains its popularity and in many instances merchants would welcome speedier deliveries. The same applies to the better quality anthracites and it is still difficult to accumulate sufficient quantities to enable satisfactory stocks to be held. Industrial requirements continue to be met fairly promptly.

NORTH WALES

Adequate tonnages of the more expensive house coal are available, but arrivals in the lower groups have not been plentiful and most merchants have been pressing for despatches. Though traders are alive to the importance of laying down stocks for next winter, in many cases lack of finance, and ground space, is proving a handicap.

After the initial rush for supplies at the lower summer prices, Phurnacite deliveries are now returning to normal, but anthracite arrivals are insufficient to meet all demands. While the call for premium smokeless fuels is normal for the time of year, the demand for Sunbrite coke is poor and, consequently, all grades are easy to obtain. Industrial requirements can be met satisfactorily.

SOUTH-WEST LANCASHIRE

The improved demand for house coal continues and merchants report a steady flow of orders for all types. There is greater interest being shown, particularly for stocking purposes, in the best grades of large house coal. Supplies from the collieries are satisfactory and the depots are receiving sufficient to give fairly prompt execution of orders. Smokeless house fuels such as Coalite and Rexco are meeting a consistently good demand and satisfactory supplies are available. No interest is shown by householders in anthracite, although merchants will undoubtedly wish to stock these qualities during the summer months.

The gas coke market is suffering from the end of central heating and, as yet, none of these customers are putting down stock. The demand for both hard and gas coke qualities for general industrial purposes is well maintained and supplies are available promptly. The industrial market generally continues to be satisfactory.

Average prices (per ton) of house coal are as follow:—Group 1, 192s. 8d.; Group 2, 173s. 3d.; Group 3, 156s. 5d.; Group 4, 144s. 8d.; Group 5, 131s. 7d.; Group 6, 121s. 5d.; Group 7, 107s.

Calderhead Mines Rescue Team's Success

FOURTH annual Divisional Mines Rescue Competition held at Calderhead Colliery (Lanarkshire) on Saturday, was won by Fauldhead Colliery (East Ayr Area) by a margin of 15 points from its nearest rival, Mauchline & Lochlea (West Ayr Area).

The successful team—J. Black (captain), J. McClusky, A. Nimmo, J. Auld, T. Auld, and R. Gray (reserve)—almost made a clean sweep, as in addition to the Divisional Trophy, which was presented by Mr. L. R. Milligan, deputy chairman, they won the NACODS Gallery Prize presented by Mr. J. Houston, president of the Scottish branch, and the individual prizes given by BACM and presented by Mr. W. Duncan on behalf of the association, for the best Nos. 1, 2, 3, and 5. The prize for the best No. 4 was won by Arniston after a tie with Bowhill.

All-round Improvement in Coal Situation

STATISTICS supplied by the Ministry of Power show a much improved situation throughout the coal industry. Total output rose last week by nearly 200,000 tons to 4,006,300 tons, compared with 4,044,600 tons a year ago. Manpower losses have dropped to under 1,000 overall and to 300 at the face. Productivity for the week ended May 6 rose to 83.84 cwt. at the face and 29.02 cwt. overall, compared with the average for the year so far of 82.1 cwt. and 28.6 cwt., and the 1960 figures of 80.44 cwt. and 28.54 cwt.

After showing an upward trend, undistributed stocks went down by almost 200,000 tons and about 150,000 tons more is being held by industry, public services, and merchants. Domestic coal consumption showed an increase of over 150,000 tons and more than compensated for a slight fall in most other sectors.

There were 575,480 wage-earners on colliery books on May 6, against 609,580 on May 7, 1960, the number engaged at the coal face being 215,630 and 233,380 respectively. Total absenteeism (all workers) in the week ended May 6, was 13.98 per cent., compared with 14.82 per cent. in the week ended May 7, 1960. Output at the face was 4,192 tons and overall 1,451 tons in the week ended May 6, compared with 4,022 and 1,427 tons in the week ended May 7, 1960.

The following table gives (in tons) the revised output of saleable mined coal by division in the week ended May 13, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended May 13, 1961.		Week ended May 14, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish ..	352,000	9,000	371,000
Northern (N&C) ..	248,000	—	245,000
Durham	463,000	—	460,000
North-Eastern ..	871,000	2,000	843,000
North-Western ..	244,000	1,000	271,000
East Midlands ..	922,000	—	909,000
West Midlands ..	285,000	6,000	284,000
South-Western ..	372,000	9,000	390,000
South-Eastern ..	30,000	—	30,000
Great Britain—			
Deep-mined coal .	3,787,000	27,000	3,803,000
Other deep-mined (including licensed mines) ..	42,000	—	45,000
Open-cast coal ..	177,000	—	157,000
TOTAL	4,006,000	27,000	4,005,000

ALLIED IRONFOUNDERS, LIMITED—Owing to differences of view on policy, Mr. H. C. Wilson Bennetts has resigned from the board.

Recent Wills

WHITWORTH, SAMUEL, a retired coal miner of Shawforth, near Rochdale (Lancs) £5,975

WOOD, DANIEL, of Whitley, near Dewsbury (Yorks), formerly proprietor of Falhouse Colliery £20,318

WIGGLESWORTH, J. H., general secretary of the Iron, Steel and Metal Dressers' Trade Society £5,016

SINDLE, J. W. W., former secretary and a director of the Chesterfield Tube Company, Limited £12,731

BONNER, ALBERT, a director of the Phoenix Iron Works Company, Limited, Littleborough (Lancs) £40,549

CHARLTON, J. L., local director of the Newcastle office of Hargreaves Coal & Shipping, Limited £13,200

BAINS, T. W., of Little Eaton, one-time secretary of the East Midlands Colliery Owners' Association ... £3,362

TOZER, ALBERT, of Morecombe, founder of Haugh Shaw Brass Foundry, Limited £1,868

LIVERSIDGE, BERNARD, retired metallurgist, former member of the staff of Thos. W. Ward, Limited, Sheffield £10,344

CHAYTOR, COL. D'ARCY, former chairman of Pooley Hall Colliery Company, Limited, Tamworth (Warwickshire) £172,897

GRINDROD, J. C., formerly secretary of David Bridge & Company, Limited, specialist engineers, of Castleton (Lancs) £6,226

ALLDAY, G. W., for more than 50 years a member of Heeley & Peart, Limited, malleable ironfounders, of Newport (Mon) £83,553

CRONSHAW, C. J. T., former director of Imperial Chemical Industries, Limited, the Manchester Ship Canal Company, etc. £70,718

BROWN, G. A., chairman and managing director of George Brown & Company (Marine), Limited, shipbuilders, of Greenock £47,536

CARROLL, JOHN, deputy chairman of Settle Speakman & Company, Limited, coal factors, shippers, etc., of Stoke-on-Trent (Staffs) £37,230

COPFIELD, G. D., manager of the No. 5 (Rhymney Valley) Area of the South-Western Divisional Coal Board until his retirement in 1958 ... ... £7,358

TAGG, W. H., mining engineer and one-time deputy Area production manager, No. 4 (Carlton) Area, North-Eastern Divisional Coal Board £27,808

AGUTTER, A. W. V., a director of Centaur Tool Works, branch of Coventry Machine Tool Works, Limited, and president of the British Association of Machine Tool Merchants in 1954 ... ... £8,821

FLEMING, SIR ARTHUR PERCY MORRIS, the distinguished electrical engineer who helped to make radar possible, formerly a director of Associated Insulation Products, Limited, and a former president of the Institution of Electrical Engineers £202,984

COULSON, S. T., formerly chairman of the North Brancepeth Coal Company, Limited, and Richardsons, Westgarth & Company, Limited, and a director of a number of other companies £82,538

SMITH, ARTHUR, pioneer in the manufacture of lawnmowers, inventor of a weighing and packaging machine, and for a number of years a director of H. C. Webb & Company, Limited, lawnmower manufacturers, of Birmingham £234,506

THORNYCROFT, SIR JOHN EDWARD, chairman and governing director of John I. Thornycroft & Company, Limited, marine engineers and shipbuilders, and a former president of the Institute of Civil Engineers, the Institute of Naval Architects, and the Institution of Mechanical Engineers £77,870

INTESTATE

CRUMP, E. F., representative of Accles & Pollock, Limited, seamless welded tube manufacturers, of Oldbury, Birmingham £6,004

Tool Firm's Extension Plans Appeal Dismissed

APPEAL by Cyril Kieft & Company, Limited, heavy edge tool manufacturers, of Wolverhampton (Staffs), against the refusal of Wolverhampton Corporation to permit a works extension for forge manufacture at the firm's Reliance works in the town, has been dismissed by the Minister of Housing and Local Government.

Announcing his decision, the Minister said that the consolidation of old and new plant was seriously detrimental to the health and general living conditions of a predominantly residential neighbourhood by reason of the increased noise which must result.

Obituary

Former training officer at Alfreton Colliery, Derbyshire, who retired through ill-health, Mr. HAROLD GREAVES, has died at the age of 63.

The death has occurred at the age of 51, of Mr. ROBERT ROWLAND MARRIOTT, works manager at Parker Foundry (1929), Limited, Derby, for the past five years.

Cllr. ALEC HOULDSWORTH, formerly maintenance manager of Wilsons & Mathieson, Limited, ironfounders and gas stove manufacturers, of Leeds, has died at the age of 65.

Mr. BERNARD DRESNER, co-director of B. Morris Metals, Limited, scrap metal merchants, of Sunderland, died last week as the result of an accident at the company's scrap metal yard. He was 75.

The death has occurred, at the age of 75, of Mr. JOHN WILLIAM BRAY, formerly a buyer with the Barrow Haematite Steel Company, Limited. He worked for the firm from the age of 13 until he retired in 1946.

The death has occurred, at the age of 73, of Mr. CLIFFORD DAWSON, former works manager of John Davis & Son (Derby), Limited, manufacturers of mining and scientific apparatus. He retired in 1953 after more than 50 years' service, but had continued his connection with the company.

Mr. CHARLES HERBERT WEAVER, who was undermanager at Minnie Pit (Staffs) on the occasion of both disasters early in the century, has died at the age of 91. He was awarded the Carnegie Certificate for the part he played in rescue operations. After leaving the mining industry he ran a coal and haulage business for many years, retiring two years ago.

Canadian Steel Output Takes Encouraging Turn

ALTHOUGH Canadian steel production declined in the first four months of this year, compared with the corresponding period in 1960, in April there was an encouraging turn as output showed a fair improvement. Steel officials, however, are finding it difficult to forecast a long-range term. Increasingly vigorous competition from European producers makes oversea selling more difficult, while in the domestic market many customers are keeping inventories at low levels.

The Bureau of Statistics reported that steel ingot production increased 9 per cent. in April to 551,071 tons, from 505,373 tons a year ago, while in the first four months the cumulative total production was 2,021,484 tons—down 8 per cent. from 2,198,167 tons.

INDUSTRIAL ACCIDENTS INCREASE

INDUSTRIAL accident figures for 1960 were "quite shocking," said Sir Howard Roberts in his presidential address to the conference of the Royal Society for the Prevention of Accidents (industrial safety division) at Scarborough last Friday. Non-fatal injuries had increased by 16,118 to 189,591, and fatal injuries by 77 to 675. One of the main reasons for the increase was the sharp rise of those occurring in the building industry.

Sir Howard said that in an effort to cope with the problem, two residential training courses for safety officers in the construction industry, had been completed in the year, and it was intended to run more.

COMPANY NEWS

WILLIAM COOK & SONS (SHEFFIELD), LIMITED, general steelfounders, of Sheffield—Profits for the year rose to £131,051 (£106,064) and dividend has increased to 25 (22½) per cent.

BOWTHORPE HOLDINGS, LIMITED—Group net profit for 1960 of £369,003 compares with £375,923, after tax of £335,362 (£311,632). The final payment is 15 per cent., making 22 (28½ equivalent) per cent.

HUNSLET (HOLDINGS) LIMITED, locomotive builders and makers, etc., of Leeds—The whole of the share capital of Materials Handling Equipment (Great Britain), Limited, of Maidenhead and London, has been acquired.

ARTHUR BALFOUR & COMPANY, LIMITED—Group net profit in 1960 expanded from £167,188 to £261,430, after heavier UK tax of £232,537 (£122,795). Total dividend is raised by 3 per cent. to 12 per cent. with a final of 9 per cent.

AERIALITE, LIMITED, electric cable manufacturers, of London, W.3—Interim dividend is being reduced from 20 per cent. to 15 per cent. for the year ending May 31, 1961. A total of 54 per cent. has been paid for the three previous years.

J. & H. B. JACKSON, LIMITED, metal merchants, of Coventry—The offer for all the capital of Brett's Stamping Company, Limited, has been accepted by holders of over 90 per cent. of the shares and has been declared unconditional.

MELLOWES & COMPANY, LIMITED, manufacturers of metal windows, dies and moulds, etc., of Sheffield—A final dividend of 6½ per cent. makes 11 (10 equivalent) per cent. for 1960. Group net profit improved to £114,802 (£95,960) after tax of £118,095 (£100,527).

PLESSEY COMPANY, LIMITED, general engineers, of Ilford (Essex)—Interim payment is to be raised from 7 per cent. to 8½ per cent. on capital increased by a one-for-two rights issue against acquisition of the Garrard Engineering & Manufacturing Company, Limited.

BLAW KNOX, LIMITED, steel works and furnace equipment manufacturers, etc., of London, S.W.3—The company suffered a setback in 1960 and profits contracted to £106,926 (£203,877). By halving the final to 10 per cent. total dividend for the year is reduced to 20 (30) per cent.

ENGLISH STEEL CORPORATION, LIMITED—Group net profit for the year ended December 31, 1960, is £2,469,174 (£2,634,292) and dividend 12 (10) per cent. The chairman, Viscount Knollys, states that production is being maintained in the current year and on present prospects this should continue.

N. GREENING & SONS, LIMITED, woven wire manufacturers, of Warrington (Lancs)—Group net profits of £320,070 in the year ended March 31, 1961, compare with £227,063, after tax of £339,487 (£277,417). The dividend is raised from the equivalent of 9½ per cent. to 11 per cent., with a final of 8½ per cent.

ANDERSON, BOYES & COMPANY, LIMITED, makers of coal-cutting machinery, power loaders, mining switchgear, etc., of Motherwell (Lanarkshire)—For the year to February 28, 1961, 10 per cent. dividend is being paid against 9 per cent. forecast last November. Net profit is £543,939 (£598,599), after tax, etc., of £677,670 (£515,871).

MARSHALL SONS & COMPANY, LIMITED, general engineers and machinery manufacturers, of Gainsborough (Lincs)—While trading results for the first half-year to end-March reveal a satisfactory improvement in the position compared with the previous year, it is the directors' view that the declaration of an interim dividend would not be prudent.

WILLIAM DOXFORD & SONS, LIMITED—Full details of the proposed merger with Sunderland Shipbuilding Dry Docks & Engineering Company, Limited, have been sent to members. The new company will be named the Doxford & Sunderland Shipbuilding & Engineering Company, Limited, and if the merger becomes fully effective will have an issued capital of £4,062,500.

FLUIDRIVE ENGINEERING COMPANY, LIMITED, fluid transmission engineers, of Isleworth (Middx)—It is intended to issue 150,000 £1 ordinary shares by way of rights to holders of the 40,000 ordinary shares in the proportion of three for eight. The price of the shares will be determined later. An extra-ordinary meeting is called for June 1 to create 200,000 £1 ordinary shares.

WORTHINGTON-SIMPSON, LIMITED, manufacturers of pumps and pumping machinery, brass and iron castings, etc., of Newark (Nottinghamshire)—Orders have been coming in at a record level and the order-book is in a "very satisfactory state" says Mr. P. B. H. Brown, the chairman. At the same time he thinks future trading prospects must be looked at with certain reservations and fears that margins must shrink.

BRITISH STEEL CONSTRUCTIONS (BIRMINGHAM), LIMITED—Group net loss of £170,723 was incurred for the 53 weeks ended September 3, 1960, against a loss of £81,906 for the previous 52 weeks. There was no UK tax charge (£2,439), and for the sixth successive year there is no dividend. A drastic reorganization, including board changes, has taken place and the board expects a small profit for the current year.

ROLLS-ROYCE, LIMITED—Consolidated revenue increased to £109,250,000 (£97,500,000) in 1960 and, with a final of 8½ per cent., the dividend is raised to 11 (10) per cent. Net profit is £3,158,636 (£2,636,469) after tax of £2,016,000 (£2,240,000). The board has under consideration the raising of additional capital by a further issue of debenture stock to be offered to holders of ordinary, workers (1955), and 4 per cent. debentures 1974-84.

PULSOMETER ENGINEERING COMPANY, LIMITED, pumping and filtering engineers and ironfounders, of London, W.C.1—In deciding to follow up the approaches made to them with a view to a merger, the directors had in mind that, apart from management and costs, one of the group's pressing problems is its cash position, states the chairman, Mr. H. T. Collinswood. A cash offer for both classes of capital, which has been made by Booker Bros. McConnell & Company, Limited, is recommended by the Pulsometer board.

G. & J. WEIR HOLDINGS, LIMITED—Turnover fell 10 per cent. last year, compared with 1959 when output exceeded £21,000,000. The trading surplus was £1,796,323 (£2,476,387). In previous years with extended order-books and larger delivery requirements, it was usually possible to forecast the group's performance for the year with a fair measure of accuracy, but as those conditions no longer obtain to the same degree, the chairman, Viscount Weir, will defer any conclusions regarding prospects until the annual meeting in Glasgow on June 7.

MANCHESTER SHIP CANAL COMPANY—Mr. R. M. Lee has been elected a director of the company to succeed Sir Cuthbert Clegg, who resigned last month.

Coal Chartering

ONCE again the main interest from Hampton Roads has been the fixing of tonnage to load coal from Japan and irrespective of position, rates are steady and continue to advance. Basis Hampton Roads/South Japan, a 14,800 tonner for May/June secured $11.00 and this rate was also paid for 14,000 tons to Chiba, May shipment, whereas for end of May/June 10, 21,500 tons accepted $9.00; 19,000 tons July/August, $9.25; and 15,500 tons for July was fixed at $10.00.

There is quite a good interest to the Brazils, 15,500 tons being fixed for June at $6.50 and 13,500 tons for two trips commencing August at $6.25, for Rio de Janeiro discharge. Other fixtures include about 15,000 tons for end of May, Roads to Porto Marghera at $5.15 with free discharge, and similar size for May 25/June 20 to West Italy at $4.40 also free discharge, and from Newcastle, NSW, 10,600 tons has been taken for Japan at 47s. 6d. f.i.o. and trimmed for end of May/June 10. Gdynia or Gdansk to Dublin reports 20s. 6d. for 4,100 tons basis f.i.o. and trimmed, with interest maintained.

Quiet conditions prevail from the UK to the Mediterranean area, although there is still quite a good demand for coasting tonnages from the UK, particularly east coast loading, on Scandinavian account.

Fewer Men Mine More Coal in West Midlands NCB

IN the first four months of 1961, overall productivity in the West Midlands Divisional Coal Board rose by 4.7 per cent., compared with the same period last year. At the coal face the increase was 4.6 per cent. OMS overall was just above 30 cwt., and at the face 94.6 cwt. Total saleable output fell by 6 per cent. to 4,818,400 tons, and manpower declined by 9 per cent. to 42,270.

Saleable output in April, in which the Easter holiday fell, totalled 1,043,000 tons, 4.9 per cent. less than in April last year, due to the smaller labour force, but productivity was higher.

Cannock Chase Area achieved record productivity at the coal face for the third consecutive month. The April figure of 98.5 cwt. was 1.4 cwt. higher than in March, and 10½ cwt. above April last year.

Colliery Annual Holidays

SINCE publication in last week's issue of IRON AND COAL of the National Coal Board's list of commencing dates on which collieries will take their annual holidays, we have been informed that the NCB list is incorrect so far as the North Wales Area of the North-Western Division is concerned.

The North Wales Area period this year is from July 31 to August 12 for all collieries.

"OPERATIONAL RESEARCH" will be the subject of a one-day conference organized jointly by the Operational Research Society and the British Institute of Management at the Connaught Rooms, London, W.C.2, on June 6. The speakers will include Mr. R. H. Collcutt, British Iron and Steel Research Association, presenting a case study on "Importing Iron Ore," and Mr. S. Beer, the United Steel Companies, Limited, is to be a member of a Brains Trust session.

European Coal Output

THE appended figures relating to coal output and imports are taken from statistics issued from Geneva by the Coal Committee of the Economic Commission for Europe.

Tonnages are metric, and the number of underground workers employed relates approximately to the end of the month.

TABLE 1.—*European Coal Output (Metric Tons) and Employment.*

Country.	Output.		Underground employment.	
	February, 1961.	January, 1961.	February, 1961.	January, 1961.
Belgium	1,856,000	1,338,000	76,000	77,000
France	4,530,000	4,767,000	123,000	124,000
Italy	55,000	48,000	—	—
Netherlands	1,007,000	1,170,000	—	28,000
Poland	8,631,000	9,036,000	216,000	216,000
United Kingdom	15,645,000	15,285,000	465,000	466,000
Spain	1,111,000	1,127,000	—	—
Western Germany	11,404,000	12,430,000	297,000	297,000

TABLE 2.—*European Solid Fuel Imports in February, 1961, with Figures for January, 1961, shown in Brackets (Metric Tons).*

Importing country.	Coal and patent fuel.	Coke.	Lignite and brown coal briquettes.
Austria	286,000	55,000	41,000
	(342,000)	(61,000)	(49,000)
Belgium	298,000	23,000	10,000
	(282,000)	(10,000)	(8,000)
Denmark	271,000	119,000	18,000
	(374,000)	(170,000)	(26,000)
Finland	126,000	7,000	—
	(224,000)	(28,000)	(—)
France	933,000	467,000	44,000
	(963,000)	(475,000)	(36,000)
Greece	8,000*	2,000*	—
	(42,000)	(2,000)	(—)
Eire	143,000*	1,000*	—
	(160,000)*	(—)	(—)
Italy	795,000	11,000	20,000*
	(999,000)	(12,000)*	(18,000)*
Luxembourg	20,000	324,000	12,000
	(19,000)	(354,000)	(12,000)
Netherlands	542,000*	35,000*	30,000*
	(642,000)	(40,000)	(24,000)
Norway	34,000*	41,000*	—
	(30,000)*	(56,000)*	(—)
Portugal	32,000	6,000	—
	(31,000)	(7,000)	(—)
Sweden	121,000	66,000	3,000
	(180,000)	(148,000)	(2,000)
Switzerland	106,000	26,000	19,000
	(136,000)	(21,000	(19,000)
United Kingdom	—	—	—
	(—)	(—)	(—)
Western Germany	447,000	20,000	360,000
	(552,000)	(23,000)	(380,000)

* Secretariat estimate.

£375,000 Offer for Oxley Engineering

STRUCTURAL engineers and electrical welding specialists, of Leeds, Oxley Engineering Company, Limited, with which is incorporated Thomas Dryden & Sons, Limited, is to be merged with Robert Dempster & Sons, Limited, wholly owned by De Vere Holdings, Limited.

De Vere's will make an offer for the £375,000 capital of Oxley Engineering on the basis of one De Vere ordinary 5s. share plus 9s. in cash for every three Oxley 5s. shares.

FIRTH-VICKERS STAINLESS STEELS, LIMITED—Group net profit for the year ended September 30, 1960, was £1,299,326 (£565,095), after tax of £1,214,500 (£597,000).

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AP 3/1393

In Parliament

Fuel Oil Duty Burden on Steel

WHEN the Finance Bill was again considered in Committee, MR. GERALD NABARRO (Con.), said that the cost of the increase in fuel oil duty to the steel industry would be £7,000,000 a year, or 8s. per ton, although it would not be possible to assess it exactly until it became clear whether the oil companies were going to pass the whole of the increase on to fuel oil or spread it over all petroleum products. This additional burden, following closely on the "savage coal price increase" last September, which added £12,000,000 to the cost of steel production, would make it even more difficult to hold the home trade price in steel at its present level. The application of the duty could only be entirely inflationary. It had been protested against on exactly these lines by the principal steel manufacturers, and he hoped that the appropriate trade unions would add their voices.

Mr. T. H. H. SKEET (Con.), said that the UK was falling out of step with Europe. "If we go back to 1956 we were then much in line with their energy policies and price structure. The EEC has since accepted the position that coal must accept the discipline of the market, with certain reservations, and that we can only have an expanding economy using a plentiful supply of low-cost fuels." He said that the steel industry had introduced economies to be more competitive with Europe. Steel did not want protection, but wanted to be in a position to reduce its costs. Some companies were experimenting with fuel oil injection into blast furnaces, and it was possible that by this scheme there would be a saving of 2 cwt. of coke per ton of iron produced. All the incentives for doing this, however, were being thrown to the wind.

While the Government was exhorting British industry to do its utmost in Europe, it was putting on a charge of £48,000,000, 95 per cent. of which had to be carried by British industry. "We exhort and yet visit industry with penalties. How does the Chancellor expect to succeed in his European policies?"

MR. MICHAEL FOOT (Lab.), said he thought the Chancellor had "snatched" at this money for revenue purposes, instead of thinking out what would be a proper fuel policy. For years the coal industry had had one burden after another imposed on it by Government action, and for 10 years was not allowed to charge the prices it could have charged. During this time, other industries had got their coal cheaper than most of their competitors in Europe.

If, from 1946 until 1957, which saw the beginning of the recession in the coal industry, the Coal Board had been able to charge what the market would have borne, there would have been no question of a deficit. The board would have piled up a huge surplus which it could have used in bad times. When the coal industry was in the middle of a depression it was unjust to say that the market price must apply and that coal must be sold at a competitive price, when no such claim was made during the previous 10 or 12 years.

MR. JACK JONES (Lab.), said that the ridiculous position existed that an ingot of steel weighing 5 or 6 tons had to be rolled by electricity produced from oil which had been increased in cost. Then, as bars, that steel was put on the railway and pulled by diesel-traction engines, whose operating costs had been increased. It was drawn into wire and other types of steel, again at increased cost. "So it goes out to industry, all the time increasing in cost to the point where it cannot be sold. It is as simple as that."

Coal Imports Decision is Deferred

STATEMENT on the Government's policy on coal imports, brought into prominence by the present application of the Steel Company of Wales, Limited, to import coking coal from the United States, has been deferred. Questioned about the application, MR. RICHARD WOOD, Minister of Power, said he did not expect to make an early statement on coal imports policy because of the importance of the issues raised. He added that the President of the Board of Trade would defer a decision on the company's application until consultation with appropriate authorities had been completed.

MR. GERALD NABARRO (Con.), said that any refusal to allow British steel manufacturers to import coal that was cheaper than British coal would be inconsistent with the continuous exhortation from Ministers to British manufacturers to increase their competitiveness abroad and reduce their prices. He asked the Minister to make it clear to Mr. Robens, chairman of the National Coal Board, that the fault lay in the "unwieldy and out-of-date" price structure of the board. MR. WOOD replied that Mr. Nabarro had put his finger on two of the important issues he would be considering.

MR. JAMES GRIFFITHS (Lab.), who also urged that the price structure of the board should be reviewed, asked whether its prices had not been subject to Ministerial approval. MR. WOOD replied that one of the main issues now being considered was the competitiveness of the coal industry at home.

MR. RAY GUNTER (Lab.), said it would be very unfortunate if the slowly mounting confidence in the coal industry was to receive another blow, and that the large number of vacancies in Wales would be very difficult to fill. He asked that the board should be given a chance to prove its faith in mechanization, and asked the Minister to start talks with the board and other interested parties to see if some satisfactory solution could be reached which might only be temporary. MR. WOOD replied that this was precisely the course he had in mind.

MR. WOODROW WYATT (Lab.), said it should be made clear that if the steel companies imported coal, the Coal Board would be able to import steel from outside the countries now affected by the 10 per cent. tariff. MR. WOOD assured him that there was nothing to prevent the Coal Board, if it chose, from importing steel from abroad. Answering a further question, he said that the Coal Board spent £35,000,000 on steel in 1960.

When asked if American coal was being sold below the cost of production and might, therefore, come within anti-dumping legislation, MR. WOOD said he was informed that this was not the case.

SHORTAGE OF MINEWORKERS

POINTING out that there was a shortage of mineworkers in Lancashire, MR. ALAN FITCH (Lab.), asked the Minister of Power for an assurance that no pits would be closed because of this shortage. MR.

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JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, said there was no reason to think that the shortage of miners would cause any closures in any district. While agreeing that some anxiety existed about the rate at which men were leaving the industry, he said the urgent task facing the Coal Board was to offset the effects of lower manpower by higher productivity.

In reply to MR. ELLIS SMITH (Lab.), who asked for more expenditure by the Coal Board in improving conditions of work of miners, MR. GEORGE said substantial improvements had already been made by the board, which had "nothing to be ashamed of" in its record in caring for the social welfare of employees, as far as its financial resources allowed.

MANPOWER IN STEEL INDUSTRY

FIGURES showing the numbers employed in the iron and steel and tinplate industries in England and in Wales at the latest available date, compared with the figures for 1951 and 1956 respectively, were given by MR. JOHN HARE, Minister of Labour, in reply to a question from MR. RAYMOND GOWER (Con.).

The figures for England were: Iron and steel (including tinplate): 1951, 321,440; 1956, 331,630; 1960, 381,790; tinplate only, 1951, 1,060; 1956, 940; 1958, 460. The figures for Wales were: Iron and steel (including tinplate): 1951, 70,880; 1956, 77,160; 1960, 78,530; tinplate only: 1951, 16,840; 1956, 14,150; 1958, 9,910. The figures given are those for mid-year.

Asked by MR. GOWER whether there was evidence that the greatly increased number of people required for the expansion of these industries in South Wales would be forthcoming, in view of problems such as housing, MR. HARE said it was his hope that these vacancies would be filled as they arose.

SALE OF KRUPP ASSETS

DISCUSSION on the disposal of the Krupp assets again took place in the House of Lords when the MARQUESS OF LANSDOWNE, Under Secretary of State, Foreign Affairs, said that assets to the value of about £12,000,000 had been sold or ceded under the Krupp deconcentration plan of 1953. While there was no firm basis for an estimate, the actual present-day value of the Rheinhausen assets represented by the shares held by the disposal trustees on Herr Krupp's behalf, which included all the coal and steel assets subject to disposals under the plan, was thought to be considerably in excess of £100,000,000.

The obligation to sell under the Bonn Convention remained in force but the time for disposal had been extended until January 31, 1962. He agreed with Lord Elibank that the Krupp concern had recently announced the biggest turnover in its history—£452,000,000 at the new exchange rate.

LEVEL OF STEEL PRICES

IN a question about UK steel prices, MR. JAMES CALLAGHAN (Lab.), suggested that although these were still lower than those of many other countries, there was a case for reducing the level of prices in view of the "fantastically high profits" which the large steel companies had been making during the last few years. MR. RICHARD WOOD, Minister of Power, replied that under statute, the fixing of steel prices was a matter for the Iron and Steel Board, and he saw no reason for interfering with that responsibility.

MR. GERALD NABARRO (Con.), said that with the increase in fuel oil duty the annual costs of steelmaking were increased by about £5,000,000. He asked the Minister what steps he was taking to initiate conversations with the British Iron and Steel Federation with a view to preventing price increases. MR. WOOD again replied that steel prices were a matter for the Iron and Steel Board.

MINES ACCIDENT RATE

REFERRING to the report of the Inspector of Mines and Quarries for Northumberland and Cumberland, MR. WILL OWEN (Lab. & Co-op.), said the increase in the accident rate both underground and on the surface was causing considerable disquiet in this section of the mining community.

MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, replied that neither the Ministry nor the Coal Board were indifferent to any rise in the accident rate, but the rate shown in this area was just about the national average. A review was going on all the time into the needs of mechanization with regard to safety, and education courses in safety were going on all the time.

COAL FOR WELSH INDUSTRIES

PRICE of coal supplied to industries engaged in the export drive in Wales should be cut with a view to promoting exports and avoiding the need to import cheap coal from oversea, urged MR. DONALD BOX (Con.). He asked the President of the Board of Trade to make representations to the National Coal Board.

MR. RICHARD WOOD, Minister of Power, replying to the question, said he did not think it would be either practical or appropriate for the board to relate its prices to the export performance of its customers.

ASKED BY Mr. Ray Gunter (Lab.), about the report of the Gas Council regarding the importation of liquid methane, the Minister of Power said he expected to receive this in a few days. A statement would be made in the House before any decision regarding imports was announced, he said.

ASKED by Mr. Ellis Smith (Lab.), about working conditions in coal mines of those suffering from pneumoconiosis and other respiratory weaknesses, Mr. John C. George, Parliamentary Secretary to the Ministry of Power, said adequate arrangements for providing suitable working conditions already existed, and no change was contemplated.

RESEARCH at the National Physical Laboratory and the National Engineering Laboratory had contributed to a tenfold increase in the accuracy of large modern gears over the past 20 years, the Parliamentary Secretary for Science told Mr. Leonard Cleaver (Con.). Gears up to 16 ft. in diameter could now be made within error of one quarter of one thousandth of an inch from the true form and spacing of the teeth.

IN REPLY to Mr. Albert Roberts (Lab.), who asked what action his Department took in respect of research into coal technology, the Minister of Power said this included research into mine safety and slagging gasification. General research into all aspects of coal technology was undertaken by industries and other organizations. He was at present carrying out his annual review of their research programmes with the help of the Advisory Council on Research and Development.

MR. NORMAN PENTLAND (Lab.), asking about future power stations in Co. Durham, said the Government appeared to have decided that the county was geographically unsuitable for power stations. He asked for another look to be taken at the possibility of siting a station in the county near the coalfield. The Minister of Power replied that his department had never suggested that no power station should be built in the county. The National Coal Board and the CEGB were continually in touch, and would no doubt take notice of what Mr. Pentland had said.

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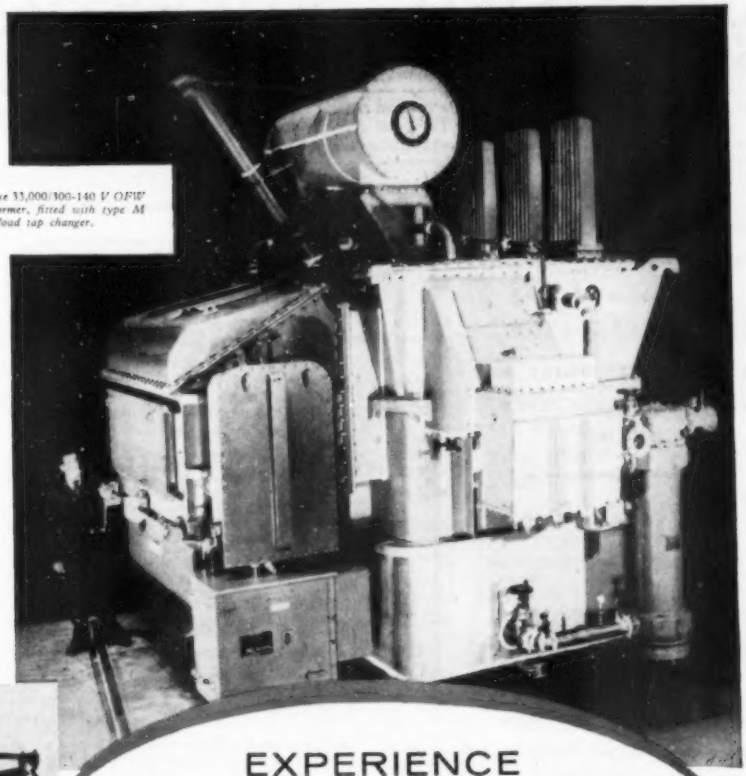

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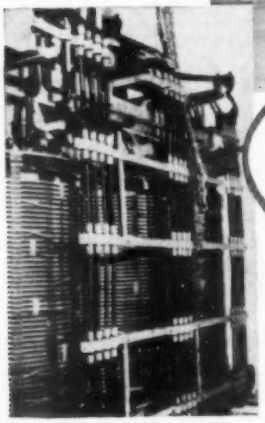

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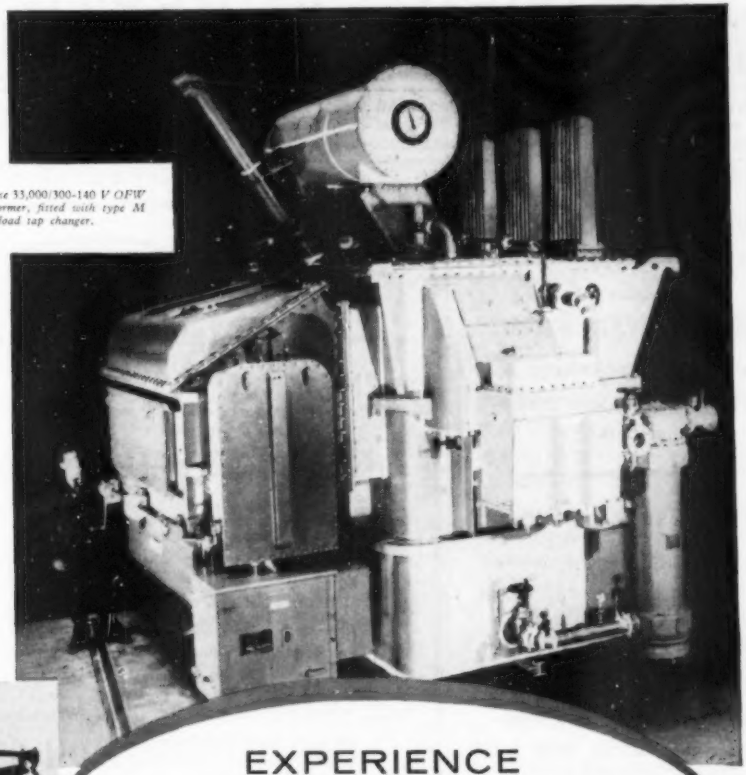

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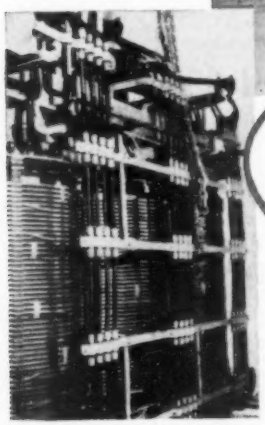

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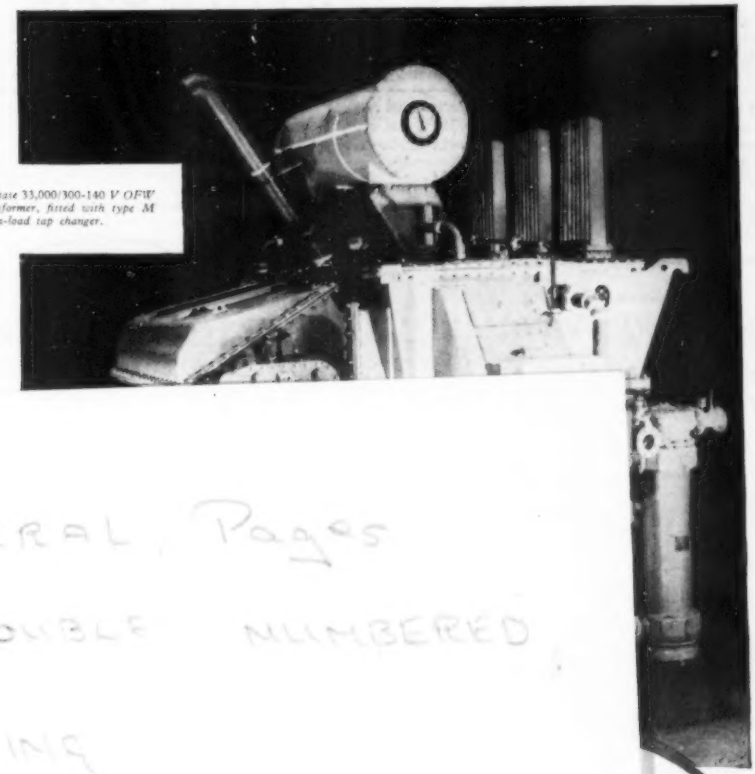
DIRECTIONS GIVEN by the Board of Trade to the Registrar of Restrictive Trading Agreements under Section 12 of the Restrictive Practices Act, 1956, authorizes him to remove from the Register all particulars of, amongst others, the following agreements:—Between 13 manufacturers of sodium hypochlorite solution and between two users of sulphuric acid.

SOUTHERN RHODESIA Minister of the Treasury and Mines is reported from Salisbury by Barclays Bank DCO to have revealed that discussions have been held regarding the possibilities of establishing a further ferro-chrome plant in the country and, should the Development Loans Guarantee Bill now before the Legislative Assembly be agreed to, it is likely that such a project could be successfully concluded.

A DEAL has been arranged, through Singer & Friedlander, Limited, merchant bankers, whereby the Coal Board Superannuation Schemes have agreed in principle to subscribe for £325,000 6½ per cent. debenture stock, 1985-90, at par, of City Business Properties, Limited. This stock will be convertible at option any time before December 31, 1969, into 4s. ordinary units of the company at 13s. a unit. The NCB further intends to "co-operate" with the company in the future.

PARTLY AS A result of many requests, the Institution of Works Managers has been holding a series of lectures on Profitable Management at the Midland Hotel, Birmingham. Third and last of the series will be held next Wednesday. The chairman will be Mr. G. W. Donovan, chairman and managing director of the Donovan Electrical Company, Limited. Inquiries should be made to the branch secretary of the Institution, Mr. A. Hooper, 153, Wensleydale Road, Perry Barr, Birmingham.

IMPORTANT DEVELOPMENTS in connection with its work on germanium are announced by Johnson, Matthey & Company, Limited, London, E.C.1. Zone-refined (50 Ω-cm., n-type) germanium is now available, normally in ingots having a nominal weight of 1 kg. A large scrap-recovery plant has been installed which enables a wide variety of types of germanium-bearing residue to be processed and the company wishes to purchase large or small quantities of germanium scrap. It will be pleased to hear from any organization having such material for disposal.



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Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

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Previous candidates for this vacancy are not required to re-apply.

Please quote Ref. No. 219/3 on all letters of application.

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Application forms, which must be returned by 26th May, 1961, can be obtained from

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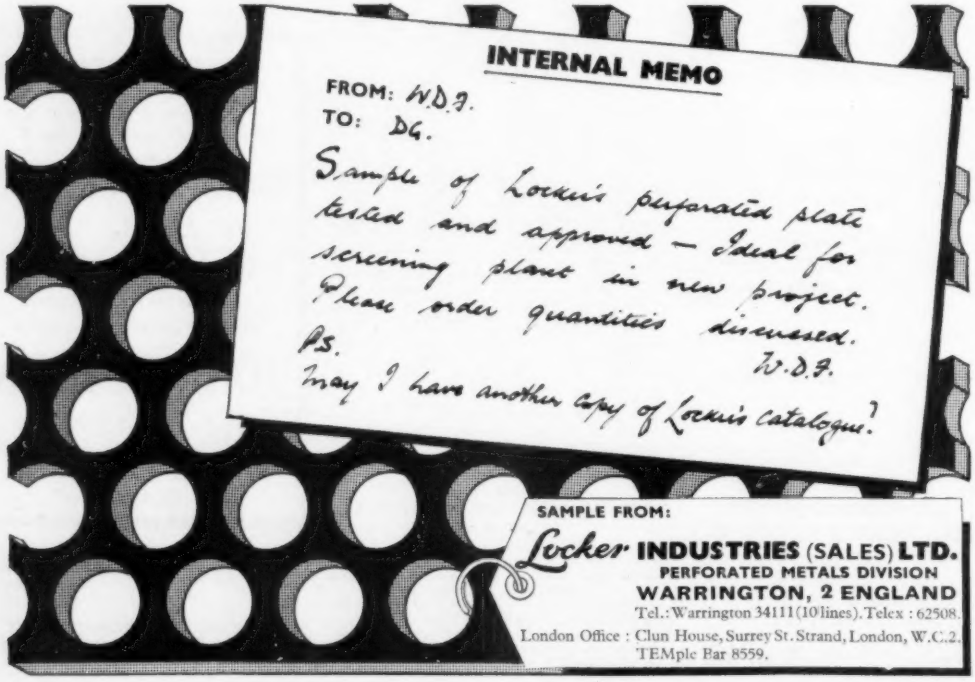
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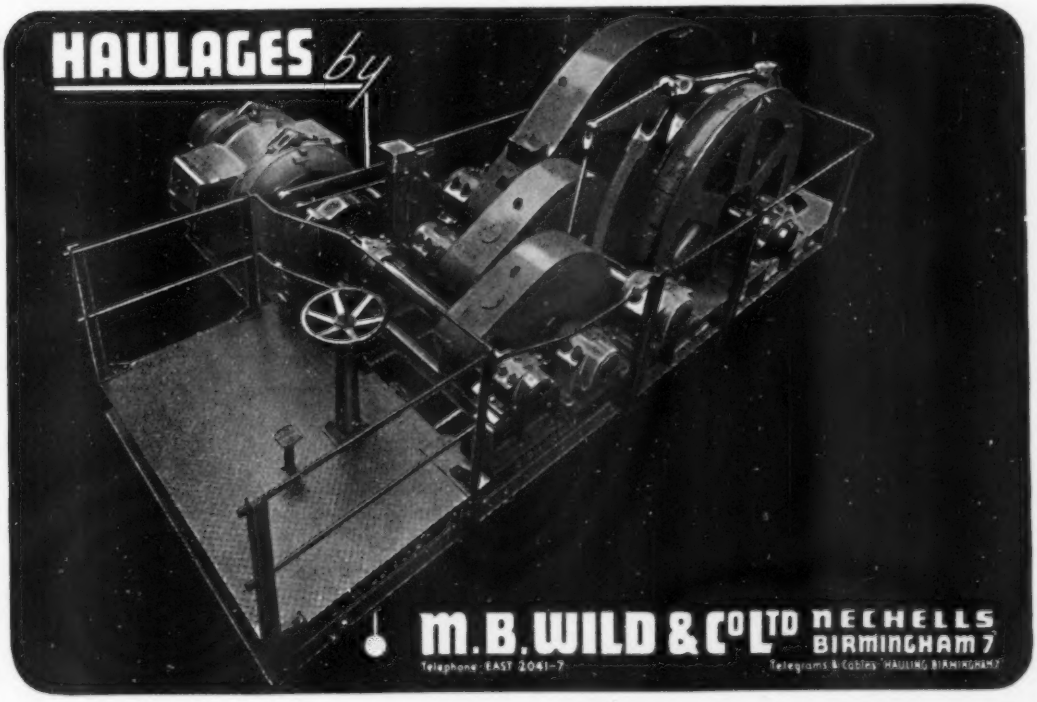

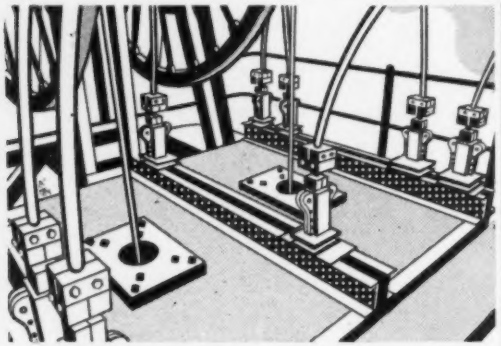

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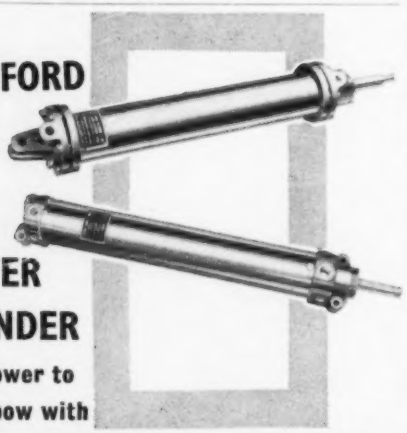

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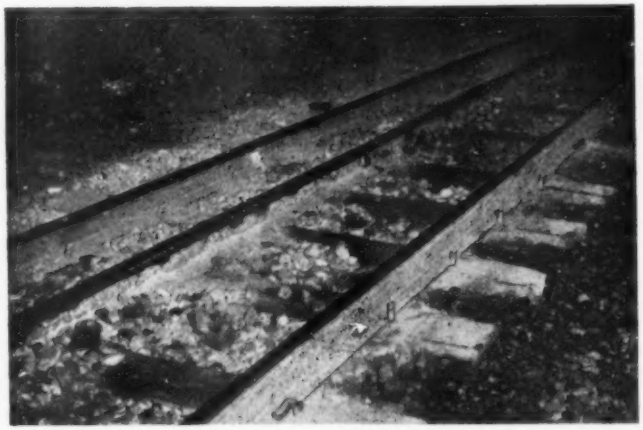

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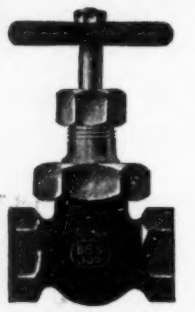

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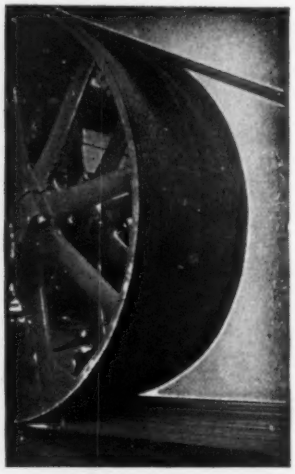

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Fig. 1.

Fig. 2.

Fig 3.

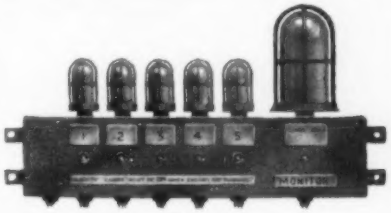

Fig. 4.

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Fig. 4. "MONITOR" panel used in conjunction with alarms.

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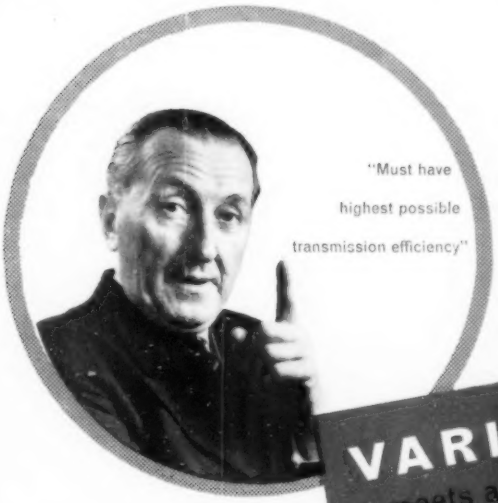

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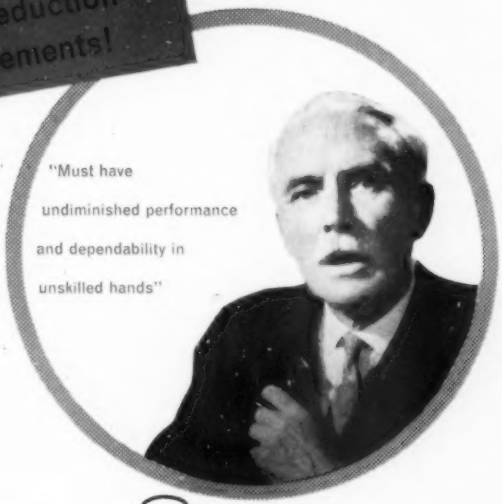

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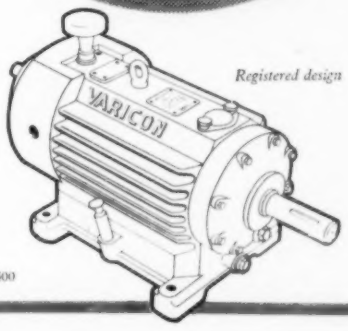

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Over forty years devoted exclusively to the manufacture of motor control gear have earned for Belmos equipment a name for reliability and trouble free service.

Area offices are established throughout the country staffed by control gear specialists who will be happy to advise on any installation problem.

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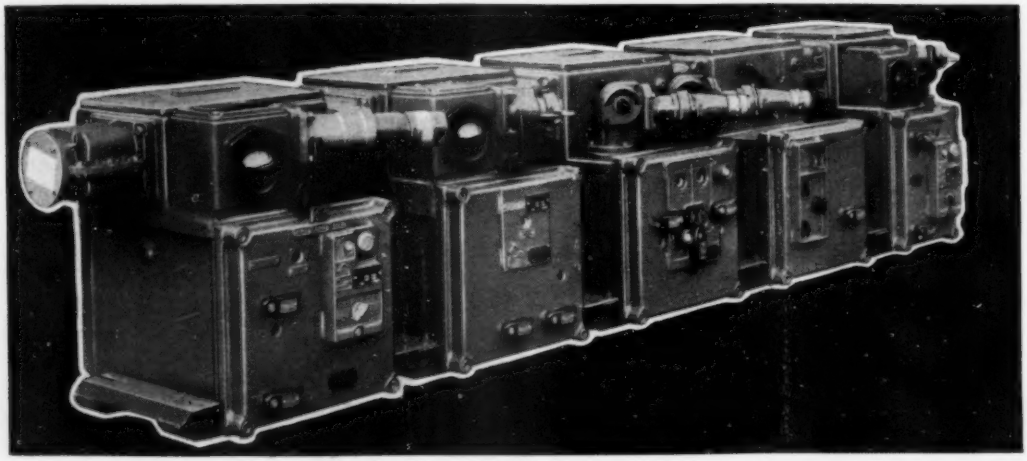

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